

ATTACHMENT A

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
)	
Preserving the Open Internet)	GN Docket No. 09-191
)	
Broadband Industry Practices)	WC Docket No. 07-52
)	
_____)	

DECLARATION OF GARY S. BECKER AND DENNIS W. CARLTON

January 14, 2010

I. INTRODUCTION AND OVERVIEW

A. QUALIFICATIONS

Gary S. Becker

1. I am University Professor at the University of Chicago in the Departments of Economics and Sociology and the Booth Graduate School of Business. I have conducted economic research on a wide variety of topics. My books include, among others, The Economics of Discrimination (1957, 1971), Human Capital (1964, 1975, 1993), Economic Theory (1971), A Treatise on the Family (1981, 1991), Accounting for Tastes (1996), The Economics of Life (with Guity Nashat Becker, 1996), Social Economics (with Kevin Murphy, 2000), and Uncommon Sense (with Richard Posner, 2009). My books have been translated into Chinese, French, German, Italian, Japanese, Russian, Spanish, and other languages. I have also published many articles in professional journals.

2. I have received a variety of awards and honors including, among many others, the John Bates Clark Medal of the American Economic Association (1967), the Nobel Memorial Prize for Economic Science (1992), the National Medal of Science (2000), and the Presidential Medal of Freedom (2007). I have also received honorary degrees from a number of institutions including, among many others, Harvard University, Princeton University, Columbia University, Hitotsubashi University, and the University of Marseilles. For almost 20 years I was a featured columnist for *Business Week* and I am now co-author (with Richard Posner) of the Becker-Posner blog (uchicagolaw.typepad.com/beckerposner). My curriculum vita is attached as Exhibit A.

Dennis W. Carlton

3. I, Dennis W. Carlton, am the Katherine Dusak Miller Professor of Economics at the Booth School of Business of The University of Chicago. I specialize in microeconomics and the economics of industrial organization, which includes antitrust and regulation, and have taught a broad variety of

topics including antitrust, finance, industrial organization, and microeconomics. I am co-author of Modern Industrial Organization, a leading text in the field of industrial organization, and I also have published many other articles in academic journals and books. In addition, I am Co-Editor of the *Journal of Law and Economics*, Co-Editor of *Competition Policy International* and on the Advisory Board of the *Journal of Competition Law and Economics*, two journals devoted to competition policy.

4. I served as Deputy Assistant Attorney General for Economic Analysis, Antitrust Division, U.S. Department of Justice from October 2006 through January 2008. I also served as a Commissioner of the Antitrust Modernization Commission, created by Congress to evaluate U.S. antitrust laws. I have served as a consultant to the Department of Justice and Federal Trade Commission on antitrust matters, and as an advisor to the Bureau of the Census on the collection and interpretation of economic data. In addition to my academic experience, I also am a Senior Managing Director of Compass Lexecon, a consulting firm that specializes in the application of economics to legal and regulatory issues. My curriculum vita is attached as Exhibit B.

B. OVERVIEW AND SUMMARY OF CONCLUSIONS

5. The FCC has proposed draft rules for “preserving a free and open Internet” and has requested comment on its draft proposals.¹ We have been asked by counsel for Verizon to review the FCC’s proposal and to offer our views on certain issues raised by the FCC’s Notice of Proposed Rulemaking (NPRM). We have been asked by Verizon to undertake an economic analysis of the FCC’s proposed rules that focuses on the likely impact of these rules on consumer welfare.

6. Many of our comments focus on the FCC’s proposed “nondiscrimination” principle, which states that “[s]ubject to reasonable network management, a provider of broadband Internet

¹ FCC, *Preserving the Open Internet; Broadband Industry Practices*, Notice of Proposed Rulemaking, 24 FCC Rcd 13064, ¶ 16 (2009) (“NPRM”).

access service must treat lawful content, applications, and services in a nondiscriminatory manner.”²

We interpret this proposed rule, along with the others proposed by the FCC’s NPRM, as an endorsement of what is generally referred to as “net neutrality.” We understand that, subject to certain limitations, the FCC’s proposed rules would prohibit broadband access providers and other providers of Internet services from: (i) prioritizing traffic and charging differential prices based on the priority status; (ii) imposing congestion-related charges; (iii) adopting business models that offer exclusive content or that establish relationships with particular content providers; and (iv) charging content providers to access the Internet based on factors other than bandwidth supplied.

7. The FCC’s NPRM suggests that net neutrality rules may be required because “market forces alone are unlikely to ensure that broadband Internet access service providers will discriminate in socially efficient ways and that, absent regulation, such discrimination is likely to change fundamentally the nature of the Internet, reduce competition, and hinder innovation and growth.”³ The NPRM further suggests that “[b]roadband Internet access service providers possessing market power may have an incentive to raise prices charged to content, application, and service providers and end users. Not only would that harm users overall, but it could reduce innovation at the edge of the network ...”⁴

8. We conclude that the concerns expressed in the NPRM are misplaced and that the imposition of net neutrality rules of the general type being proposed by the FCC is likely to harm consumer welfare. First, we conclude that the FCC’s competitive concerns are overstated due, in part, to the existing and growing competition among broadband access providers. Second, we conclude that the FCC’s proposed rules would interfere with the development of business models and network

² NPRM ¶ 104.

³ *Id.* ¶ 67.

⁴ *Id.* ¶ 70.

management practices that may be efficient responses to the large and unpredictable changes occurring in Internet demand and technology.

9. While the FCC argues that broadband access providers have the incentive and ability to disadvantage rival content providers “[w]here effective competition is lacking,”⁵ available evidence suggests that there is substantial and growing competition in the provision of broadband access services. As discussed below, data indicate that (i) multiple broadband Internet access providers are available in nearly all geographic areas; and (ii) a variety of firms are in the process of deploying new broadband access services. The rapid growth in recent years in broadband subscribers, Internet usage, service quality and reductions in price indicate that consumers have derived significant benefits from competition and innovation.

10. While the NPRM claims that broadband access providers may under certain circumstances have an incentive to discriminate against rival content providers, it fails to recognize that these circumstances are limited and further ignores the economic forces that point in the opposite direction -- namely that, regardless of the extent of broadband access competition, providers usually have an incentive to provide unrestricted access to content because such access increases consumers’ willingness to pay for broadband access services. In addition, the entry of broadband access networks that is now underway in nearly all geographic areas further mitigates such competitive concerns. The absence of widespread complaints about anticompetitive discrimination indicates that the FCC’s competitive concerns are overstated in the current Internet environment.

11. The FCC notes, correctly in our view, that the Internet has “transformed our nation’s economy, culture, and democracy.”⁶ While the Internet remains highly dynamic and is experiencing dramatic growth in demand, the FCC’s proposed net neutrality rules would freeze in place the business

⁵ *Id.* ¶ 70.

⁶ *Id.* ¶ 1.

models and network management practices that currently characterize the provision of Internet services. The FCC's proposed rules would artificially restrict the ability of Internet service providers to respond to changes in technology and demand. That restriction would be likely to harm investment, innovation, and consumer welfare.

12. The FCC's stated objective is "preserving a free and open Internet."⁷ However, this is not, by itself, an appropriate policy goal from an economic perspective. Instead, policy should focus on maximizing consumer welfare, not maintaining any particular status quo. Even if existing practices have been successful to date, the status quo may not be efficient given changes in demand and technology. Given the highly dynamic nature of the Internet in general and broadband access in particular, consumers are likely to benefit if service providers have the ability to experiment with alternative business models and network management practices.

13. It simply is not possible for regulators or others to specify today which practices will be efficient in the future and, as history shows, attempts by regulators to control the development of new technologies can result in delays in investment and innovation that harm consumer welfare. Indeed, history shows that attempts to regulate new technologies, especially in dynamic markets, carry significant risk of harm to consumer welfare due to delays in the innovation, investment, and introduction of new products. As discussed further below, a variety of studies suggest that consumers have suffered welfare losses of hundreds of billions of dollars as the result of some perhaps well-meaning but misguided regulatory actions, suggesting that unnecessary or premature net neutrality regulation also may result in large losses in consumer welfare.

14. Under these circumstances, there is likely to be little benefit to competition from imposing net neutrality regulations, but these rules may impose potentially large costs on consumers by interfering with the development of efficient business models and network management practices and

⁷ *Id.* ¶ 16.

creating risks that regulations will harm consumer welfare by harming incentives for firms to invest and innovate as well as in other unanticipated and unintended ways. Instead of imposing far-reaching rules in anticipation of possible competitive problems, which have occurred infrequently to date, such concerns can be better addressed through antitrust enforcement and/or more limited regulatory mechanisms, if and when problems occur.

15. The remainder of our analysis is organized as follows:

- Section III presents background on the Internet and evaluates the FCC's competitive concerns. We show that there is no basis to conclude that broadband providers will engage in widespread anticompetitive discrimination in the absence of net neutrality rules. This is due, in part, to the current levels and growth in broadband access competition, which we review in this section. We also show that potential competitive harm can likely be deterred by mechanisms that are less likely to harm consumer welfare than net neutrality rules and that history indicates that regulators are not likely to be good at specifying the network practices and business models that are most likely to promote consumer welfare.
- Section IV discusses recent and expected changes in Internet services and technologies and shows how net neutrality rules may interfere with the development of efficient business models and network management practices, deter investment, and harm consumer welfare.

III. THE COMPETITIVE CONCERNS RAISED BY THE FCC DO NOT REQUIRE IMPOSITION OF NET NEUTRALITY RULES.

16. This section first presents background information on Internet technology and regulation. We then show that the competitive concerns identified by the FCC do not justify imposition of the proposed net neutrality rules because (i) broadband Internet access remains a highly dynamic

business in which the vast majority of subscribers have access to multiple broadband access providers and the risk of anticompetitive conduct is declining still further due to increasing competition; (ii) the competitive concerns raised by the FCC have not occurred on a widespread basis; and (iii) the potential competitive concerns identified by the FCC can likely be better addressed by antitrust enforcement and/or more limited regulatory mechanisms, if they occur.

A. BACKGROUND

17. The provision of Internet services involves a wide variety of service providers including, (i) providers of “last mile” Internet access services, (ii) Internet backbone operators, and (iii) content providers.⁸

- Broadband Internet access services today are largely provided by cable companies, telephone companies, and wireless carriers. As discussed further below, new fourth generation (4G) wireless broadband Internet access services are now being deployed in a wide variety of areas, and several firms have announced plans to offer new broadband access services based on wireless, fiber and satellite technologies. Rates charged by broadband Internet access providers are unregulated.
- Internet backbone providers provide high-capacity long-haul transmission services typically with fiber optic transmission technologies. Backbone providers’ networks interconnect at multiple bilateral connection points and hubs which connect multiple networks. The resulting network of Internet backbone facilities typically provides for multiple routes between points. The financial terms of these arrangements are unregulated.

⁸ FTC Staff Report, “Broadband Connectivity Competition Policy,” <http://www.ftc.gov/reports/broadband/v070000report.pdf>, at 23-28 (June 2007) (“FTC Staff Report”) provides a more detailed overview of these components of Internet services. There is significant overlap in the firms that operate in these three categories.

- Content and application providers operate using a variety of business models. Large content providers may operate their own “server farms” with direct access to an Internet backbone. Some large content providers use distributed servers in multiple geographic areas to store or “cache” content closer to end users in order to improve service quality. Smaller content providers often contract with third parties to host content and to provide connection to the Internet. The terms of these arrangements also are unregulated.

18. The lack of systematic Internet regulation is summarized by a recent FTC report which notes that, “since about 2000, the FCC has undertaken a substantial and systematic deregulation of broadband services and facilities, concluding that cable, wireline, powerline, and wireless broadband Internet access services are ‘information services’ that are not subject to common carrier requirements.”⁹ As a result, providers of Internet services are not required to provide physical connections to other carriers; nor are they subject to obligations to provide services at “just and reasonable” rates or to comply with non-discrimination requirements.¹⁰ Similarly, the provisioning of backbone traffic and interconnection is unregulated. The FTC also notes that “[t]o this day, there are no general, industry-specific regulations that govern backbone interconnection in the U.S.”¹¹

19. As this summary indicates, the evolution of Internet business models and network management practices, many of which remain in early stages of development, largely has been driven by market forces. Internet traffic has generally been handled by service providers on a “first-in-first-

⁹ FTC Staff Report at 3.

¹⁰ *Id.* at 42.

¹¹ *Id.* at 25.

out” and “best efforts” basis.¹² While it has long been possible as a matter of technology to prioritize Internet traffic, Internet traffic has not typically been delivered or priced on this basis.

B. THE FCC INCORRECTLY ASSUMES THAT BROADBAND PROVIDERS WILL ENGAGE IN ANTICOMPETITIVE CONDUCT IN THE ABSENCE OF NET NEUTRALITY RULES.

20. As discussed above, the FCC concludes that net neutrality regulations are necessary because “market forces alone are unlikely to ensure that broadband Internet access service providers will discriminate in socially efficient ways and that, absent regulation, such discrimination is likely to change fundamentally the nature of the Internet, reduce competition, and hinder innovation and growth.”¹³

21. As a preliminary matter, it is important to note that (i) the mere existence of price differences does not imply price discrimination; and (ii) the existence of price discrimination does not necessarily imply harm to competition. For example, price differences attributable to differences in the quality of service are not “discriminatory” but instead can reflect the higher cost of providing higher quality services. Price discrimination in an economic sense exists when different groups pay different prices for identical services. Even then, the impact of discrimination on consumer welfare is ambiguous, and can result in an increase in output relative to the level that would exist without discrimination.¹⁴ More specifically, price discrimination can result in prices to certain consumers that are below those that would prevail in the absence of discrimination, leading to an increase in sales to these consumers and to an expansion of total sales. Moreover, such price discrimination raises the firm’s profits, which may create incentives for broadband access providers to invest in expanding or upgrading their networks compared to the investments that would be undertaken in the absence of discrimination.

¹² *Id.* at 2.

¹³ NPRM ¶ 67.

¹⁴ The FCC itself recognizes that discrimination can advance consumer welfare. NPRM ¶ 103.

Price discrimination is widespread in our economy and need not result in harm to competition -- i.e., harm to the competitive process that deprives or impedes consumers' access to alternative suppliers with the result that prices are higher than they would otherwise be.

22. The FCC claims that providers of broadband Internet access services may have an incentive to discriminate against rival content providers by charging relatively high fees (or providing lower quality service) to those rival content providers to reach the broadband subscribers and or even by denying access to rival content providers altogether. The economic literature discusses the applicability as well as the limitations of such a claim.¹⁵

23. Because price discrimination need not result in harm to competition or consumers, the elimination of all forms of discrimination is not an appropriate policy goal from an economic perspective and any examination of the effect of discrimination on competition is likely to require a detailed fact-specific analysis. As discussed in more detail below, available evidence indicates that regulators' interventions in similar circumstances, while well-meaning, have often resulted in harm to consumer welfare. Antitrust enforcement remains an alternative mechanism for identifying and correcting circumstances in which discrimination harms competition and thereby lowers consumer welfare.

24. More importantly, however, the NPRM fails to fully consider other incentives to provide unrestricted access to all Internet content faced by broadband access providers. These other incentives mitigate or eliminate any incentive to engage in anticompetitive discrimination and thus undercut the competitive rationale for net neutrality regulation.

¹⁵ See, for example, Richard Posner, *Antitrust Law*, 2nd ed. (2001), pp. 198-99. M. Whinston, "Tying, Foreclosure, and Exclusion," 80 *American Economic Review* 837 (1990), J. Choi and C. Stefanadis, "Tying, Investment, and Dynamic Leverage Theory," 32 *RAND Journal of Economics* 52 (2001), D. Carlton and M. Waldman, "The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries," 33 *RAND Journal of Economics* 194 (2002), B. Nalebuff, "Bundling as an Entry Barrier," *Quarterly Journal of Economics* 159 (2004).

25. First, competition among broadband access providers enables consumers to switch providers if they are not satisfied with the service from their existing provider. As discussed further below, today virtually all broadband subscribers have access to at least two, and often more, providers of broadband access services, including cable, DSL and, increasingly, wireless alternatives. In addition, available data indicate that subscribers frequently switch service providers and that broadband access providers face considerable customer “churn.”¹⁶ As a result of this competition, attempts by a broadband access provider to limit access to Internet content would be likely to result in the loss of subscribers that prefer unrestricted access, which provides a competitive constraint that limits incentives for such actions. The FTC shares this view, noting in its 2007 report that “[a]bsent coordination or collusion among providers, as long as consumers have one or more alternatives to which they can turn, it is difficult to imagine them accepting the blockage or elimination of content that is important to them.”¹⁷

26. Second, regardless of the competitive alternatives available, discrimination by broadband access providers that limits access to content usually reduces the amount that consumers are willing to pay for broadband access services. That is, consumers are willing to pay more for access to more content and, as a result, broadband access providers face disincentives for restricting access to Internet content.

C. BROADBAND ACCESS HAS BEEN CHARACTERIZED BY RAPID GROWTH IN OUTPUT, DECLINES IN PRICES AND DIRECT COMPETITION FOR NEARLY ALL CONSUMERS.

27. In today’s (largely) unregulated environment, output of broadband services has grown rapidly and prices have fallen sharply in recent years. Between mid-2002 and mid-2008, the number of high-speed broadband access lines in the U.S. grew from 16 million to nearly 133 million and the

¹⁶ “Churn” is an industry term which refers to the fraction of a service provider’s customers lost in a given time period.

¹⁷ FTC Staff Report at 157.

number of residential broadband lines grew from 14 million to nearly 80 million.¹⁸ Available data also indicate that Internet traffic roughly tripled between 2007 and 2009.¹⁹

28. At the same time, prices for broadband Internet access services have fallen sharply. According to the FTC, “[b]y one estimate, the average monthly revenue per user of DSL service decreased from 40 dollars in 2002 to 31 dollars in 2006. [...] Quality-adjusted cable modem prices too have fallen.”²⁰ For example, in 2002, Charter Communications was offering broadband service with 512 to 768 kbps speeds for \$40 per month.²¹ Today, Charter offers bandwidth of 10 mbps, roughly 13 to 20 times faster service, for the same \$40 per month.²² Similarly, the price of Verizon DSL service with 768 kbps download bandwidth fell from \$49.95 in 2001 to \$19.99 in 2007.²³ The Bureau of Labor Statistics’ Consumer Price Index for Internet services fell by roughly 25 percent over the last five years.²⁴

29. As noted above, the NPRM claims that competition in the provision of broadband access competition may not be “effective” and thus may not constrain broadband access providers from engaging in anticompetitive discrimination. However, available data also indicate that most areas are

¹⁸ FCC, *High Speed Services for Internet Access*, <http://www.fcc.gov/wcb/iatd/comp.html> (follow July 2009 Release to Tables 1, 3) (“FCC High Speed Services Report”).

¹⁹ University of Minnesota Internet Traffic Studies, <http://www.dtc.umn.edu/mints/home.php>, p. 5 of 7, accessed on December 22, 2009; and Goldman Sachs, “Broadband 100: Fears ‘Over the top’? Early stage broadband video investing across Tech, Media and Telecom,” p. 7, May 2009 (“Broadband 100”).

²⁰ FTC Staff Report at 101 (internal citations omitted).

²¹ Jason Bazinet, Mark Crossman, Spencer Wang, J. P. Morgan, “Broadband 2003: Deflation Looms and Market Shares Will Shift,” p. 8 (December 5, 2002).

²² <http://www.charter.com/Visitors/Products.aspx?MenuItem=36>.

²³ R. Litan and H. Singer, “Unintended Consequence of Net Neutrality Regulation,” 5. J. on Telecom. & High Tech. L. 533 (2007), available at SSRN: <http://ssrn.com/abstract=942043>.

²⁴ BLS, Consumer Price Index – All Urban Consumers, Series SEEE03: Internet services and electronic information providers, <http://data.bls.gov:8080/PDQ/servlet/SurveyOutputServlet;jsessionid=6230780901981e1c6623> (last visited Jan. 11, 2010).

served by multiple providers of broadband Internet access services. FCC data indicate that in June 2008, the most recent data available, 99.8 percent of zip codes in the U.S. had two or more providers of high speed Internet lines available and 94.6 percent of zip codes had four or more providers.²⁵

30. Available data also indicate that switching or “churn” among broadband customers is substantial.

- Available data indicate that churn among broadband customers is comparable to that observed among consumers of other telecommunications services. For example, Cablevision’s monthly churn rate in 4Q 2007 was 2.1 percent for its cable customers and 2.2 percent for its high speed data customers.²⁶ Similarly, monthly churn in 2008 among Verizon’s FiOS customers (who receive both video and Internet access services), was 2.0 percent,²⁷ while churn among Verizon’s wireless subscribers was 1.3 percent.²⁸
- The research firm IDC conducts an annual survey of broadband subscribers in the U.S. and its most recent report notes that “broadband churn is on the rise.”²⁹ The IDC data indicate that more than 50 percent of subscribers had switched at some point since adopting broadband.³⁰

²⁵ *FCC High Speed Services Report*, Table 15. The FCC tracks high speed lines available through ADSL, SDSL, cable modem, fiber, satellite, fixed wireless, mobile wireless and power line technologies.

²⁶ Buckingham Research, *The Last Mile – Monitoring Quarterly Trends in Telecommunications, Video and Data*, August 27, 2008, p. 91.

²⁷ Credit Suisse, *Verizon – Positioning for the Future*, October 22, 2009, p. 17.

²⁸ RBC Capital Markets, *Wireless Retail Update – Telecommunications Services*, Nov. 22, 2009, p. 2.

²⁹ IDC, “Profile Of U.S. Broadband Consumers – 2009 Survey,” (December 2009), p. 20.

³⁰ IDS “churn” measures exclusively reflects customers that switch broadband suppliers; Verizon churn figures reflect customer terminations for all reasons including, for example, cancellations and moves.

D. INCREASES IN BROADBAND COMPETITION FURTHER REDUCE THE LIKELIHOOD OF THE COMPETITIVE CONCERNS RAISED BY THE FCC.

31. Competitive concerns of the type cited by the FCC are further mitigated by the entry of new broadband service providers. In addition, existing providers are expanding and upgrading their networks in response to, and in anticipation of, the large on-going increases in Internet demand, which are discussed in more detail below. The new technologies being offered by both entrants and existing market participants, including 4G wireless services (using WiMax or LTE technologies), high-capacity fiber-based services, and upgraded cable-based services (using DOCSIS 3.0 technology), offer significant increases in throughput to subscribers.

32. In a recent report for the FCC, the Columbia (University) Institute for Tele-Information identified a wide variety of high capacity broadband access services now in the process of being deployed.³¹ Among others:

- Clearwire announced that its 4G wireless broadband services using WIMAX technology will be launched in 25 markets by the end of 2009.
- MetroPCS announced that its 4G wireless service will be deployed in the second half of 2010.
- Sprint announced plans to launch its dual mode 3G/4G service in at least 10 markets in 2009 and that it will continue to add markets in 2010.
- AT&T announced that it will begin trials of its 4G LTE wireless broadband technology in 2010 and will launch service in 2011. AT&T also announced that its U-Verse Fiber/DSL service will pass 30 million homes by 2011.
- Cincinnati Bell launched its fiber-to-the-home (FTTH) service in 2009.
- Verizon announced that it will offer 4G LTE wireless broadband technology to 100 million people by 2010 and to virtually its entire service area by 2013.³² Verizon has

³¹Robert Atkinson and Ivy Schultz, Columbia Institute for Tele-Information, "Broadband in America: Where It is and Where It is Going, Preliminary Report Prepared for the Staff of the FCC's Omnibus Broadband Initiative," at 51-52 (November 11, 2009) ("CITI Report").

³² CITI Report at A-35.

announced plans for its FiOS service to cover 70 percent of the footprint of its local telecommunications network.

- ViaSat and Hughes Communications have each announced plans to deploy “high throughput” satellite-based broadband access services. Each firm is expected to have the capacity to provide broadband services to roughly 2 million homes.³³

33. The CITI Report also shows that 4G deployments will compete directly with wireline and other existing broadband providers. For example, it shows that 4G wireless broadband offerings will have downstream speeds of 4-12 Mbps range, which is comparable to or higher than that offered by many wireline broadband services providers.³⁴ It also shows that prices for early 4G deployments are comparable to those for wireline broadband services.³⁵

34. The CITI Report further shows that entry and deployment of upgraded services is not limited to major metropolitan areas. CITI tracks the activity of Wireless Internet Service Providers (WISPs) which provide wireless broadband services in rural areas using Wi-Max technology and reports that “the 350 members of the WISP Association – far from the total number of WISPs – provide fixed broadband wireless services to over 2 million locations.”³⁶ CITI also reports that OpenRange, a WISP funded by private and public sources, has “plans to use Wi-MAX to initially serve 6 million people in 546 communities in 17 states and recently began offering its first services ...”³⁷ The credibility of these announcements is reinforced by CITI’s analysis that compares the initially projected and actual deployment dates for broadband projects publicly announced in 2004-05. Their analysis indicates that

³³ *Id.* at 57.

³⁴ *Id.* at 24.

³⁵ *Id.* at 34-35.

³⁶ *Id.* at 24.

³⁷ *Id.* at 24 (internal citations omitted).

all of the projects announced in that period were completed and that the large majority launched within a few months of the date initially projected.³⁸

35. As these examples indicate, broadband access providers typically face significant competition and a wide range of firms are entering and/or upgrading their service offerings. Under these circumstances, broadband service providers that adopt business models that don't meet consumers' preferences and expectations risk losing substantial numbers of subscribers. These circumstances reduce the risk that attempts by broadband access providers to engage in discrimination will succeed in impairing competition and further suggest that the FCC's competitive concerns are overstated.

36. More generally, the rapid growth and dynamic nature of broadband Internet services provides existing market participants and entrants with strong incentives to compete and attract new customers, even when there are a limited number of suppliers.³⁹ Under these conditions, firms compete to attract new customers and retain existing ones by attempting to be the first to offer higher service quality as well as through price competition. Given the large investments being undertaken by broadband Internet access providers to support the expansion in output, regulatory policies that discourage investments supporting network upgrades can result in significant harm to consumer welfare.

³⁸ *Id.* at 41.

³⁹ Even limited competition when networks were first deploying service has been found to have significant effects. For example, the early adoption of broadband was significantly higher in areas served by both cable modem and DSL providers compared to those served by only one technology. As discussed by Crandall, "Broadband Communications," in Majumdar, Vogelsang, and Cave, eds, Handbook of Telecommunications Economics, v. 2 (2005), p. 177, Burnstein and Aron show that in 2002, 14.5 percent of households in areas served by both cable and DSL providers received broadband compared to 8 percent of households in areas served by only one technology. (D. Burnstein and D. Aron, "Broadband Adoption in the United States: An Empirical Analysis," in A. Shampine, ed., Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications Technology (2003)).

E. THERE IS NO EVIDENCE TO DATE OF WIDESPREAD COMPETITIVE PROBLEMS.

37. To support its argument that net neutrality rules are required to avoid anticompetitive discrimination, the NPRM highlights two circumstances in which broadband access providers have attempted to degrade services provided by rival content providers. The FCC highlights Comcast's alleged attempts to degrade Internet traffic from the "BitTorrent" application, a technology which uses multiple sources in delivering services via the Internet to a single computer.⁴⁰ BitTorrent is typically used to distribute large video files which may compete with programming provided through Comcast's cable-TV service. The FCC also highlights efforts by Madison River, a small local exchange carrier, to block its DSL subscribers from accessing VoIP providers such as Vonage which compete with telephone service provided by Madison River.⁴¹ The FCC stresses that both Comcast and Madison River did not disclose to subscribers that they had engaged in these network management practices.⁴²

38. Comcast contends that its actions were undertaken to relieve network congestion caused by the high traffic volume generated by BitTorrent users. In response to the complaint about these practices, Comcast developed an alternative network management plan that, instead of selectively blocking BitTorrent traffic, caps usage by subscribers that are intensive consumers of bandwidth.⁴³ More specifically, during periods of congestion the highest volume users have their traffic assigned a lower priority until the period of congestion ends.⁴⁴ While the facts of the Madison River

⁴⁰ NPRM ¶ 37.

⁴¹ *Id.* ¶ 32.

⁴² *Id.* ¶¶ 37, 123.

⁴³ We understand that the FCC accepted Comcast's revised network management plan but did not drop the case in response as requested by Comcast. We also understand that Comcast is now challenging the FCC's order. NPRM ¶ 37.

⁴⁴ Letter from Comcast to Marlene H. Dortch, FCC, *Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications*, File No. EB-08-IH-1518; *Broadband Industry Practices; Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management,"* WC

case are less clear, Madison River entered into a consent decree with the FCC, made a “voluntary” payment of \$15,000 and agreed to cease its practice of attempting to block subscribers’ access to VoIP services.⁴⁵

39. The Comcast and Madison River cases appear to be isolated incidents and, by themselves, do not suggest that broadband access providers to date have engaged in widespread efforts to degrade Internet traffic by rival content providers. This may be due in part to the risk of losing subscribers to rival access providers that will provide unrestricted access to Internet content. We understand that both Comcast and Madison River modified their network management practices shortly after detection even though the FCC’s authority to require any such modification remains uncertain. These circumstances suggest that both Comcast and Madison River were concerned that, once public, information about their actions could lead to customer complaints and/or result in the loss of subscribers.

40. Actions that facilitate the transparency of broadband access providers’ network management practices may facilitate the timely detection of attempts at anticompetitive discrimination. We understand that Verizon has publicly supported the creation of industry best practices or principles aimed at increasing transparency and providing consumers with meaningful information concerning network management practices or other aspects of available Internet and broadband services and applications.

41. The ability of content providers and others to detect (and publicize) efforts by access providers to block or degrade content also helps deter these activities. The ability of content providers

Docket No. 07-52, Attachment B, “Comcast Corporation Description of Planned Network Management Practices to be Deployed Following the Termination of Current Practices,” at 2 (Sept. 19, 2008) (“Comcast Network Management Plan”).

⁴⁵ J. Gregory Sidak, “A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet,” 2 *Journal of Competition Law and Economics* 349, 415 (2006).

and others to detect anticompetitive discrimination is facilitated by their ability to establish benchmarks based on network performance in different geographic areas. A variety of organizations are active in monitoring Internet performance and offer tools to achieve this goal. For example:

- Akamai's Site Analyzer allows detailed analysis of each Internet transaction step and the localization of any problems by type, location and network.⁴⁶ Users can even "set up alerts on performance degradation and availability.... Alerting allows owners to proactively act upon these degradations before actual end users report the same."⁴⁷
- Measurement Lab, also known as M-Lab, "is an open, distributed server platform for researchers to deploy Internet measurement tools. The goal of M-Lab is to advance network research and empower the public with useful information about their broadband connections."⁴⁸ M-Lab was founded by the Open Technology Institute, the PlanetLab Consortium, Google Inc. and academic researchers. M-Lab supports a variety of network diagnostic tools on servers in a variety of locations.⁴⁹
- Internet performance monitoring is also regularly undertaken by academic researchers. For example, the Georgia Tech Network Operations and Internet Security Lab recently released NANO (Network Access Neutrality Observatory), an Internet performance monitoring tool which "detects whether a user's access ISP is discriminating against certain users, destinations or applications."⁵⁰ Similarly the Max Planck Institute for

⁴⁶ See Akamai Site Analyzer Service Description.

http://www.akamai.com/dl/feature_sheets/Akamai_Site_Analyzer_Service_Description.pdf (July 2009).

⁴⁷ *Id.* at 12.

⁴⁸ <http://www.measurementlab.net/about> (last visited Dec. 22, 2009).

⁴⁹ See *id.*

⁵⁰ <http://gtnoise.net/>.

Software Systems conducts research on measurement of network performance and identifying technical discrimination.⁵¹

F. ALTERNATIVE MECHANISMS EXIST FOR DETERRING THE POTENTIAL ANTICOMPETITIVE CONDUCT THAT IS THE FOCUS OF THE FCC'S CONCERNS.

42. The FCC's NPRM recognizes that discrimination can either benefit or harm consumer welfare and acknowledges that "[t]he key issue we face is distinguishing socially beneficial discrimination from socially harmful discrimination in a workable manner."⁵² Attempting to determine when "discriminatory" business practices harm competition and thereby lower consumer welfare typically requires detailed fact-specific analysis that takes into account factors such as (i) the impact of discrimination on competition in both upstream (content) and downstream (broadband access) markets; (ii) the efficiency rationale for such practices; and (iii) the potentially adverse impact of a remedy (such as imposing a duty to deal with a rival) on incentives for investment and innovation.

43. Analysis of the impact of discrimination on competition is a common focus of antitrust analysis by economists and courts, and antitrust enforcement provides a mechanism for addressing competitive concerns of the type raised by the FCC. Alternatively, forms of regulation short of net neutrality may be used to address specific anticompetitive circumstances if and when such circumstances may arise. Limited legal and regulatory responses tailored to specific harms actually observed in the marketplace, as opposed to imposition of expansive and preemptive regulatory rules based on competitive circumstances not widely observed in the marketplace, would be likely to protect competition while reducing the risk of potentially large harm to consumer welfare.

⁵¹ See, for example, M. Dischinger, A. Mislove, A. Haeberlen, and K. Gummadi, "Detecting BitTorrent Blocking," Max Planck Institute for Software Systems, http://www.mpi-sws.org/~gummadi/papers/08_imc_blocking.pdf (2008).

⁵² NPRM ¶ 103.

44. As discussed below, preemptive imposition of net neutrality regulation limits or eliminates network service providers' ability to experiment with new business models and network management practices and can result in significant harm to consumer welfare. At the same time, the lack of widespread competitive problems to date, the availability of multiple broadband access providers and the growth in competitive alternatives indicates that such a far-reaching regulatory intervention is not necessary to protect competition.

45. Implementation of net neutrality regulations will also create uncertainty among market participants as the FCC develops complex rules and exemptions from these rules in its attempt to implement the proposed regulation. For example, the proposed language for each of the six Internet Principles proposed by the FCC stresses that implementation would be "subject to reasonable network management" considerations, and the FCC recognizes that "[t]here appear to be several types of situations that could justify a broadband Internet access service provider's acting inconsistently with the six open Internet principles described above."⁵³ The uncertainty about practices that may be prohibited under net neutrality rules would be likely to chill adoption of efficient network management practices.

G. THERE IS NO BASIS TO ASSUME THAT REGULATORS CAN SPECIFY BUSINESS PRACTICES THAT MAXIMIZE CONSUMER WELFARE, ESPECIALLY IN A RAPIDLY CHANGING ECONOMIC ENVIRONMENT.

46. The FCC's NPRM outlines its objective of maintaining many aspects of the current economic organization of the Internet into the indefinite future. However, the business models and network management practices widely used today may not best promote consumer welfare in the future. It is not realistic to believe that even well-meaning regulators can determine which business models and network management practices are likely to work best in the future. Current practices have

⁵³NPRM ¶ 136.

been driven by market factors, not regulation, and it should not be assumed without evidence that markets will fail to create incentives for efficient business practices to promote consumer welfare.

47. The unregulated Internet marketplace has resulted in rapid output growth, improved service quality and declining prices. An unregulated market also would likely result in experimentation with different business models and network management practices by broadband access providers as they respond to the large expected increases in bandwidth demand. If consumers prefer the business models and network management practices currently in use, service providers will have strong incentives to maintain them. And as long as traditional Internet access services are an available alternative, consumers would also benefit from access to additional, differentiated services that may or may not incorporate all Internet content.

48. However, studies show that attempts to regulate new or rapidly changing technologies carry significant risk of harm to consumer welfare. A 2002 paper by R. Crandall, R. Hahn and T. Tardiff reviewed the impact of regulation on new technologies through six case studies involving telephone service, television programming, cable television, wireless services, information services and converged telephone/video services. The authors conclude that:

These six cases illustrate four important points. First, regulation has often served to suppress innovation. Second, the delay in the introduction of new services can be quite costly to consumers. Third, deregulation can result in significant benefits when markets are workably competitive or even when there is arguably market power, as there was in the cable industry. Fourth, vertical integration by even large, dominant firms is often essential to the efficient development of new goods and services.⁵⁴

49. One of the studies reviewed by Crandall, Hahn and Tardiff is the 1997 analysis by J. Hausman that estimates the loss to consumers resulting from regulation-induced delays in the

⁵⁴ Robert Crandall, Robert Hahn and Timothy Tardiff, "The Benefits of Broadband and the Effect of Regulation," in Robert Crandall and James Alleman, eds., Broadband: Should We Regulate High-Speed Internet Access?, AEI-Brookings Joint Center for Regulatory Studies, Washington, D.C., (2002), p. 324.

introduction of new telecommunications technologies. Hausman analyzed costs relating to (i) delays in the introduction of voice messaging services, which resulted from the line-of-business restrictions imposed on the former Bell companies following the AT&T divestitures; and (ii) delays in the introduction of cellular telephone service due to “regulatory indecision and the subsequent licensing procedure used by the FCC, which was in charge of the cellular spectrum.”⁵⁵

50. Hausman concludes that delays in new telecommunications services caused by regulation imposed multi-billion dollar losses to consumers:

If, as I estimate, the consumer value from [voice messaging] services was \$1.27 billion in 1994, then the approximate ten-year regulatory delay cost consumers billions of dollars. Applying the methodology to the cost of regulatory delay in the introduction of cellular telephone service, I estimate the cost to consumers to be closer to \$100 billion in total, with more than \$25 billion lost in a single year.⁵⁶

IV. NETWORK NEUTRALITY RULES ARE LIKELY TO HARM CONSUMER WELFARE BY DETERRING INVESTMENT AND PREVENTING NETWORK SERVICE PROVIDERS FROM ADOPTING EFFICIENT PRACTICES.

A. CHANGES IN INTERNET-BASED SERVICES AND TECHNOLOGY

51. The on-going market-based evolution of Internet services has contributed to the tremendous growth in the use of the Internet. As noted above, the number of high-speed broadband access lines in the U.S. grew from 16 million to nearly 133 million between 2002 and 2008 and Internet traffic roughly tripled over the period 2007-2009.⁵⁷

⁵⁵ Jerry Hausman, “Valuing the Effect of Regulation on New Services in Telecommunications,” Brookings Papers on Economic Activity (1997), p, 17.

⁵⁶ *Ibid.*, p. 3.

⁵⁷ University of Minnesota Internet Traffic Studies, <http://www.dtc.umn.edu/mints/home.php>, p. 5 of 7 (last visited Dec. 22, 2009); and Goldman Sachs, “Broadband 100: Fears ‘Over the top’? Early stage broadband video investing across Tech, Media and Telecom,” p. 7 (May 2009) (“Goldman Sachs”), and FCC High Speed Services Report, Tables 1,3.

52. The growth of broadband access and other increases in the capacity of backbone networks have contributed to rapid growth in the availability and use of bandwidth-intensive services, and this growth is expected to continue and even accelerate. In a May 2009 report, Goldman Sachs noted that “[b]roadband access has reached mass market levels and is progressing toward near universal adoption. Online video is emerging as a dominant application of the incremental bandwidth.”⁵⁸ The same report notes that on-line video traffic grew 100 percent in 2008 and was expected to grow more than 75 percent in 2009.⁵⁹

53. The ability to view Internet-based video services on television sets is expected to greatly increase demand for these services, but few households today have the capability of accessing “Internet-to-TV” services. Goldman Sachs estimates that less than five percent of homes had adopted Internet-to-TV technology in 2009, but projects that this figure will rise to 20 percent within two to four years, and that adoption will then continue to grow rapidly.⁶⁰

54. The growth of high-bandwidth video services is expected to result in enormous increases in the demand for Internet bandwidth. The CITI Report projected that (non-mobile) North American consumer Internet traffic would increase from just over 1 petabit/month in 2008 to more than 7 petabits per month by 2013.⁶¹ The same report projects that the Internet bandwidth use per U.S. subscriber will grow by 360 percent between 2008 and 2013.⁶² Goldman Sachs notes that “a minute spent with streaming video consumes almost 20 times the bandwidth of a minute with a typical web

⁵⁸ Goldman Sachs at 3.

⁵⁹ *Id.* at 9.

⁶⁰ *Id.* at 16.

⁶¹ CITI Report at 49. A petabit is a unit of information equal to 1,000 terabits or one quadrillion bits.

⁶² *Id.* at 50.

page without video”⁶³ and also projects that video services will account for more than 75 percent of Internet traffic by 2012.⁶⁴

55. The growth in Internet services and the demand for bandwidth create risk of increased network congestion in the delivery of Internet services. Capacity constraints may have relatively little adverse impact on the quality of services such as e-mail and web-surfing but can have a significant adverse effect on the quality of high-bandwidth, time-sensitive services such as streaming video. Various cable networks have recently considered usage-based pricing for broadband as one alternative solution to this problem.⁶⁵ Others, including Comcast, have imposed caps on individual subscribers with high levels of broadband use.⁶⁶

56. The rapid growth of bandwidth intensive services has already changed how high-bandwidth content is delivered to subscribers. As noted above, major providers of bandwidth-intensive content often use content delivery networks (CDNs) in delivering traffic to end users. CDNs, such as Akamai, distribute copies of video files to servers at geographic locations near subscribers. These services help maintain the quality of Internet-based video services by avoiding congestion and reducing latency problems.

57. However, the manner in which delivery mechanisms will evolve and be priced has been the subject of widespread discussion among analysts and industry observers.⁶⁷

⁶³ Goldman Sachs at 7.

⁶⁴ *Id.* at 8.

⁶⁵ *Id.* at 17.

⁶⁶ See Comcast Network Management Plan.

⁶⁷ Various alternatives are discussed in J. Peha, “The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy,” 1 International Journal of Communications 644 (2007).

- As discussed above, prioritizing traffic and charging higher rates for priority traffic is one possible response to changes in Internet demand and technology.
- Networks also could include the ability to charge on the basis of content, with price differences for different types of traffic affecting overall demand and usage patterns.
- Networks could include the ability to offer customers differentiated access to the most efficient traffic routing and/or limits on the rate at which packets can be sent into the network.
- Differential pricing may be offered based on access to various services provided within the network, such as “multicasting” technology which enables a sender to reach multiple recipients without sending a separate copy to each one over the entire transmission path.

58. In addition, a variety of differentiated services may result in benefits to consumers but may be inconsistent with net neutrality rules. For example, medical and/or gaming services may require specialized performance criteria that cannot be efficiently provided to all content providers. More generally, the adoption of restrictions on network operations and business models can inhibit the development of services that otherwise might be developed in the future.

59. As these examples suggest, there are a variety of complex alternatives available to network providers wishing to establish economically efficient network management practices and services. It is unlikely that regulators can determine which combinations of these are most likely to promote consumer welfare. As noted above, errors by regulators in attempting to make such determinations can result in significant harm to consumer welfare. The large and growing importance of the Internet implies that the potential impact of regulatory errors also can be large.

B. NET NEUTRALITY RULES WOULD LIMIT THE ABILITY OF NETWORK SERVICE PROVIDERS TO RESPOND TO CHANGES IN DEMAND AND TECHNOLOGY.

60. To date, Internet service providers have maintained a “first-in-first-out approach” to network management. The imposition of net neutrality regulations, however, would require the providers of network services to maintain this approach without regard for changes in technology and consumer demand, eliminating their ability to experiment with other business models and network management practices in attempting to respond to the rapid growth of bandwidth demand.

61. The choice of network management practices depends on a variety of factors including, among other things: (i) the cost of transport capacity; (ii) the cost to consumers and content providers resulting from network congestion; (iii) the cost of distributing and storing content at multiple geographic locations; and (iv) the cost of using compression technologies in transmitting data traffic. While some alternatives like content delivery networks may now provide an efficient response for some types of content, existing models may not be efficient at the much higher levels of bandwidth demand expected in the near future.

62. In addition, net neutrality rules can interfere with pricing mechanisms that could provide signals for network providers to add capacity, or that could lead content providers to adopt efficient data compression practices. For example, in the absence of net neutrality regulation, the adoption of priority service depends both on consumers’ and content providers’ willingness to pay for higher service quality (through prioritized services) and the costs to network operators of providing such services.

63. The importance of network management practices for Internet services can be appreciated by examining the current approaches used in managing private data networks. The widespread use of “enhanced traffic management” practices in private data networks suggests that consumer welfare might be enhanced if network service providers can offer priority services. For

example, Verizon's Private IP Service, which is used by firms and organizations to link distant locations and is in widespread use today, enables users to assign different priority levels to various types of traffic.⁶⁸ Typically, Private IP Service networks assign top priority status to time-sensitive applications such as video and voice for which latency can result in a significant decline in service quality; intermediate priority classes are assigned to applications such as "business critical" traffic flows (e.g., SAP, PeopleSoft applications) and less time-sensitive video; and lower forwarding priorities are assigned to e-mail, file transfer and web browsing.

64. Verizon's Private IP Service customers can choose not to set priority levels for different types of services and Verizon could have chosen not to offer this option. Presumably, a decision not to prioritize would require users to obtain greater transmission capacity in order to maintain a given level of congestion and service quality. The decisions by Verizon and its Private IP Service network customers to prioritize private network traffic demonstrate that this feature enhances consumer welfare.

65. There are a variety of other changes in business models that may promote consumer welfare. For example, network service providers may find it efficient to charge different fees to providers of different types of services or may choose to establish relationships with content providers for differentiated offerings. As discussed above, the NPRM has identified potential competitive concerns arising from such practices. However, differentiated business models and network management practices may benefit consumers by expanding output of Internet services. For example, business models that involve payments from certain content providers to broadband access providers may enable access providers to lower prices to consumers. This approach may result in an expansion in the number of broadband subscribers and may facilitate entry by new providers of broadband access services. Similarly, broadband access providers may choose to offer different service options to

⁶⁸ See http://mediumbusiness.verizon.com/documents/resource_library/PrivateIP_FactSheet.pdf.

consumers, including services comparable to those offered today with non-prioritized access to content available on the public Internet, and enhanced services with features such as prioritized access and exclusive content.

C. IMPOSITION OF NET NEUTRALITY REQUIREMENTS IS LIKELY TO DETER INVESTMENT AND HARM CONSUMER WELFARE.

66. Imposition of net neutrality rules that limit experimentation with new business models and network management practices will prevent network operators from enhancing the functionality of their networks and will undermine the business case for investing in higher capacity broadband networks. For example, limiting pricing flexibility will reduce network operators' incentives to invest in expanding and upgrading their facilities. Such restrictions may adversely affect consumer welfare by potentially (i) reducing the geographic scope of broadband access networks; (ii) reducing backbone capacity; (iii) increasing congestion and reducing service quality; (iv) reducing the number of service providers in a given geographic area; and (v) raising prices.

67. In a recent filing, the U.S. Department of Justice (DOJ) acknowledged that price regulation is likely to deter investment and innovation. The DOJ warned that, "... care must be taken to avoid stifling the infrastructure investments needed to expand broadband access. In particular, price regulation would be appropriate only where necessary to protect consumers from the exercise of monopoly power and where such regulation would not stifle incentives to invest in infrastructure deployment." Net neutrality can be considered a form of price regulation because it limits the form of pricing that can be practiced. Such regulations thus limit a broadband provider's revenue opportunities and its ability to differentiate itself from competitors, and thereby stifle incentives to invest and innovate.⁶⁹

⁶⁹ See Ex Parte Submission of the United States Department of Justice, *Economic Issues in Broadband Competition; A National Broadband Plan for Our Future*, GN Docket No. 09-51, at 28 (Jan. 4, 2010).

68. The importance of maintaining the appropriate investment incentives for broadband network providers is highlighted by the large scale of capital expenditures that telecommunications carriers are expected to undertake in coming years. CITI estimates that telecommunications providers, including wireline carriers, wireless carriers and cable operators, made capital expenditures of \$63 billion in 2008, excluding payments related to spectrum auctions.⁷⁰ CITI also estimates that the top 10 telecommunications companies had expenditures of roughly \$58.9 billion, and that in 2009, despite the recession and financial crisis, these large companies had capital expenditures of \$51.5 billion.⁷¹

69. CITI also reports that AT&T estimates that two-thirds of its 2009 total investment (for wireless and wireline networks) is to expand its broadband capacity.⁷² Finally, CITI reports that the capital expenditures of the major wireline carriers will grow from \$22 billion in 2009 to \$24 billion in 2011, and that the share of these investments going to expand broadband will increase from 52 percent to 58 percent.⁷³

D. THE FCC INCORRECTLY ASSUMES THAT “NON-NEUTRALITY” WILL HARM INNOVATION.

70. The FCC and net neutrality proponents correctly note that the Internet has fostered tremendous innovation. However, there is no basis to conclude that “non-neutral” business models and network management practices would be expected to harm innovation. Net neutrality restrictions that limit the ability of network operators to realize the full value of their investments also limit their incentives to innovate.

⁷⁰ CITI Report at 29.

⁷¹ *Id.* at 29.

⁷² *Id.* at 30.

⁷³ *Id.*

71. The dramatic growth of applications for Apple's iPhone demonstrates that rapid innovation is possible in a differentiated or managed environment. For example, Apple's iPhone operates only on AT&T's network but has fostered the development of a wide variety of iPhone-specific applications. Application providers need approval to be carried in the iPhone "App Store," pricing must be approved by Apple, and revenue must be shared with Apple. Similarly, Verizon's FiOS service provides "widgets" that enable subscribers to access particular websites and Internet services such as Facebook through television screens. These applications are innovations that are likely to be of value to consumers but which we understand might not be available under net neutrality rules because they cannot be used to access all Internet content.

72. Net neutrality rules also can deter investment in the development of new content and applications. First, as discussed above, many factors -- including the availability of competitive providers of broadband access services -- limit the incentive and ability of broadband access providers to degrade or deny access to new content providers. In addition, network management practices that differentiate between types of traffic may improve the utilization and quality of high-bandwidth services and encourage investment in innovations that take advantage of improved network performance. For example, networks had to improve before streaming HD video applications could be developed, and they will have to improve again before streaming 3-D HD video applications can be developed. The ability of broadband access providers to enter differentiated arrangements with content or application partners may promote investment in the development of innovations and new services that would not otherwise be undertaken.

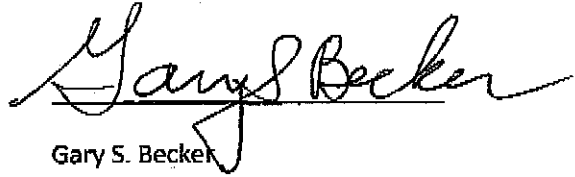
CONCLUSION

73. The FCC's net neutrality rules are motivated by the concern that broadband access providers will harm competition by disadvantaging rival content providers. We conclude that this

concern does not justify the imposition of net neutrality rules due, in part, to the existence of substantial competition today in the provision of broadband access service and the increasingly competitive nature of broadband access services now occurring as the result of the entry, expansion and upgrading of broadband networks. Under these circumstances, broadband access providers have strong incentives to retain subscribers by providing services that promote consumer welfare. Given the lack of widespread competitive problems of the type specified by the FCC to date, it is likely that remedies to future competitive problems, if they occur, can be addressed by antitrust enforcement and/or more limited regulatory mechanisms.

74. The Internet is dynamic and is undergoing dramatic increases in demand and changes in the nature of services provided. It is highly unlikely that a regulator can correctly identify the business model and network management practices that maximize consumer welfare. Indeed, historical examples indicate that past interventions by regulators can delay the introduction of new technologies and result in significant harm to consumers. The proposed net neutrality rules would freeze in place the business models and network management practices that currently characterize the provision of Internet services and artificially restrict the ability of Internet service providers to respond to changes in technology and demand. As a result, consumer welfare is likely to be harmed and service providers will face weakened incentives to invest and innovate.

I declare, under penalty of perjury, that the foregoing is true and correct.


Gary S. Becker

January 14, 2010

I declare, under penalty of perjury, that the foregoing is true and correct.

Dennis W. Carlton

Dennis W. Carlton

January 14, 2010

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
)	
Preserving the Open Internet)	GN Docket No. 09-191
)	
Broadband Industry Practices)	WC Docket No. 07-52
)	
_____)	

DECLARATION OF GARY S. BECKER AND DENNIS W. CARLTON

January 14, 2010

I. INTRODUCTION AND OVERVIEW

A. QUALIFICATIONS

Gary S. Becker

1. I am University Professor at the University of Chicago in the Departments of Economics and Sociology and the Booth Graduate School of Business. I have conducted economic research on a wide variety of topics. My books include, among others, The Economics of Discrimination (1957, 1971), Human Capital (1964, 1975, 1993), Economic Theory (1971), A Treatise on the Family (1981, 1991), Accounting for Tastes (1996), The Economics of Life (with Guity Nashat Becker, 1996), Social Economics (with Kevin Murphy, 2000), and Uncommon Sense (with Richard Posner, 2009). My books have been translated into Chinese, French, German, Italian, Japanese, Russian, Spanish, and other languages. I have also published many articles in professional journals.

2. I have received a variety of awards and honors including, among many others, the John Bates Clark Medal of the American Economic Association (1967), the Nobel Memorial Prize for Economic Science (1992), the National Medal of Science (2000), and the Presidential Medal of Freedom (2007). I have also received honorary degrees from a number of institutions including, among many others, Harvard University, Princeton University, Columbia University, Hitotsubashi University, and the University of Marseilles. For almost 20 years I was a featured columnist for *Business Week* and I am now co-author (with Richard Posner) of the Becker-Posner blog (uchicagolaw.typepad.com/beckerposner). My curriculum vita is attached as Exhibit A.

Dennis W. Carlton

3. I, Dennis W. Carlton, am the Katherine Dusak Miller Professor of Economics at the Booth School of Business of The University of Chicago. I specialize in microeconomics and the economics of industrial organization, which includes antitrust and regulation, and have taught a broad variety of

topics including antitrust, finance, industrial organization, and microeconomics. I am co-author of Modern Industrial Organization, a leading text in the field of industrial organization, and I also have published many other articles in academic journals and books. In addition, I am Co-Editor of the *Journal of Law and Economics*, Co-Editor of *Competition Policy International* and on the Advisory Board of the *Journal of Competition Law and Economics*, two journals devoted to competition policy.

4. I served as Deputy Assistant Attorney General for Economic Analysis, Antitrust Division, U.S. Department of Justice from October 2006 through January 2008. I also served as a Commissioner of the Antitrust Modernization Commission, created by Congress to evaluate U.S. antitrust laws. I have served as a consultant to the Department of Justice and Federal Trade Commission on antitrust matters, and as an advisor to the Bureau of the Census on the collection and interpretation of economic data. In addition to my academic experience, I also am a Senior Managing Director of Compass Lexecon, a consulting firm that specializes in the application of economics to legal and regulatory issues. My curriculum vita is attached as Exhibit B.

B. OVERVIEW AND SUMMARY OF CONCLUSIONS

5. The FCC has proposed draft rules for “preserving a free and open Internet” and has requested comment on its draft proposals.¹ We have been asked by counsel for Verizon to review the FCC’s proposal and to offer our views on certain issues raised by the FCC’s Notice of Proposed Rulemaking (NPRM). We have been asked by Verizon to undertake an economic analysis of the FCC’s proposed rules that focuses on the likely impact of these rules on consumer welfare.

6. Many of our comments focus on the FCC’s proposed “nondiscrimination” principle, which states that “[s]ubject to reasonable network management, a provider of broadband Internet

¹ FCC, *Preserving the Open Internet; Broadband Industry Practices*, Notice of Proposed Rulemaking, 24 FCC Rcd 13064, ¶ 16 (2009) (“NPRM”).

access service must treat lawful content, applications, and services in a nondiscriminatory manner.”²

We interpret this proposed rule, along with the others proposed by the FCC’s NPRM, as an endorsement of what is generally referred to as “net neutrality.” We understand that, subject to certain limitations, the FCC’s proposed rules would prohibit broadband access providers and other providers of Internet services from: (i) prioritizing traffic and charging differential prices based on the priority status; (ii) imposing congestion-related charges; (iii) adopting business models that offer exclusive content or that establish relationships with particular content providers; and (iv) charging content providers to access the Internet based on factors other than bandwidth supplied.

7. The FCC’s NPRM suggests that net neutrality rules may be required because “market forces alone are unlikely to ensure that broadband Internet access service providers will discriminate in socially efficient ways and that, absent regulation, such discrimination is likely to change fundamentally the nature of the Internet, reduce competition, and hinder innovation and growth.”³ The NPRM further suggests that “[b]roadband Internet access service providers possessing market power may have an incentive to raise prices charged to content, application, and service providers and end users. Not only would that harm users overall, but it could reduce innovation at the edge of the network ...”⁴

8. We conclude that the concerns expressed in the NPRM are misplaced and that the imposition of net neutrality rules of the general type being proposed by the FCC is likely to harm consumer welfare. First, we conclude that the FCC’s competitive concerns are overstated due, in part, to the existing and growing competition among broadband access providers. Second, we conclude that the FCC’s proposed rules would interfere with the development of business models and network

² NPRM ¶ 104.

³ *Id.* ¶ 67.

⁴ *Id.* ¶ 70.

management practices that may be efficient responses to the large and unpredictable changes occurring in Internet demand and technology.

9. While the FCC argues that broadband access providers have the incentive and ability to disadvantage rival content providers “[w]here effective competition is lacking,”⁵ available evidence suggests that there is substantial and growing competition in the provision of broadband access services. As discussed below, data indicate that (i) multiple broadband Internet access providers are available in nearly all geographic areas; and (ii) a variety of firms are in the process of deploying new broadband access services. The rapid growth in recent years in broadband subscribers, Internet usage, service quality and reductions in price indicate that consumers have derived significant benefits from competition and innovation.

10. While the NPRM claims that broadband access providers may under certain circumstances have an incentive to discriminate against rival content providers, it fails to recognize that these circumstances are limited and further ignores the economic forces that point in the opposite direction -- namely that, regardless of the extent of broadband access competition, providers usually have an incentive to provide unrestricted access to content because such access increases consumers’ willingness to pay for broadband access services. In addition, the entry of broadband access networks that is now underway in nearly all geographic areas further mitigates such competitive concerns. The absence of widespread complaints about anticompetitive discrimination indicates that the FCC’s competitive concerns are overstated in the current Internet environment.

11. The FCC notes, correctly in our view, that the Internet has “transformed our nation’s economy, culture, and democracy.”⁶ While the Internet remains highly dynamic and is experiencing dramatic growth in demand, the FCC’s proposed net neutrality rules would freeze in place the business

⁵ *Id.* ¶ 70.

⁶ *Id.* ¶ 1.

models and network management practices that currently characterize the provision of Internet services. The FCC's proposed rules would artificially restrict the ability of Internet service providers to respond to changes in technology and demand. That restriction would be likely to harm investment, innovation, and consumer welfare.

12. The FCC's stated objective is "preserving a free and open Internet."⁷ However, this is not, by itself, an appropriate policy goal from an economic perspective. Instead, policy should focus on maximizing consumer welfare, not maintaining any particular status quo. Even if existing practices have been successful to date, the status quo may not be efficient given changes in demand and technology. Given the highly dynamic nature of the Internet in general and broadband access in particular, consumers are likely to benefit if service providers have the ability to experiment with alternative business models and network management practices.

13. It simply is not possible for regulators or others to specify today which practices will be efficient in the future and, as history shows, attempts by regulators to control the development of new technologies can result in delays in investment and innovation that harm consumer welfare. Indeed, history shows that attempts to regulate new technologies, especially in dynamic markets, carry significant risk of harm to consumer welfare due to delays in the innovation, investment, and introduction of new products. As discussed further below, a variety of studies suggest that consumers have suffered welfare losses of hundreds of billions of dollars as the result of some perhaps well-meaning but misguided regulatory actions, suggesting that unnecessary or premature net neutrality regulation also may result in large losses in consumer welfare.

14. Under these circumstances, there is likely to be little benefit to competition from imposing net neutrality regulations, but these rules may impose potentially large costs on consumers by interfering with the development of efficient business models and network management practices and

⁷ *Id.* ¶ 16.

creating risks that regulations will harm consumer welfare by harming incentives for firms to invest and innovate as well as in other unanticipated and unintended ways. Instead of imposing far-reaching rules in anticipation of possible competitive problems, which have occurred infrequently to date, such concerns can be better addressed through antitrust enforcement and/or more limited regulatory mechanisms, if and when problems occur.

15. The remainder of our analysis is organized as follows:

- Section III presents background on the Internet and evaluates the FCC's competitive concerns. We show that there is no basis to conclude that broadband providers will engage in widespread anticompetitive discrimination in the absence of net neutrality rules. This is due, in part, to the current levels and growth in broadband access competition, which we review in this section. We also show that potential competitive harm can likely be deterred by mechanisms that are less likely to harm consumer welfare than net neutrality rules and that history indicates that regulators are not likely to be good at specifying the network practices and business models that are most likely to promote consumer welfare.
- Section IV discusses recent and expected changes in Internet services and technologies and shows how net neutrality rules may interfere with the development of efficient business models and network management practices, deter investment, and harm consumer welfare.

III. THE COMPETITIVE CONCERNS RAISED BY THE FCC DO NOT REQUIRE IMPOSITION OF NET NEUTRALITY RULES.

16. This section first presents background information on Internet technology and regulation. We then show that the competitive concerns identified by the FCC do not justify imposition of the proposed net neutrality rules because (i) broadband Internet access remains a highly dynamic

business in which the vast majority of subscribers have access to multiple broadband access providers and the risk of anticompetitive conduct is declining still further due to increasing competition; (ii) the competitive concerns raised by the FCC have not occurred on a widespread basis; and (iii) the potential competitive concerns identified by the FCC can likely be better addressed by antitrust enforcement and/or more limited regulatory mechanisms, if they occur.

A. BACKGROUND

17. The provision of Internet services involves a wide variety of service providers including, (i) providers of “last mile” Internet access services, (ii) Internet backbone operators, and (iii) content providers.⁸

- Broadband Internet access services today are largely provided by cable companies, telephone companies, and wireless carriers. As discussed further below, new fourth generation (4G) wireless broadband Internet access services are now being deployed in a wide variety of areas, and several firms have announced plans to offer new broadband access services based on wireless, fiber and satellite technologies. Rates charged by broadband Internet access providers are unregulated.
- Internet backbone providers provide high-capacity long-haul transmission services typically with fiber optic transmission technologies. Backbone providers’ networks interconnect at multiple bilateral connection points and hubs which connect multiple networks. The resulting network of Internet backbone facilities typically provides for multiple routes between points. The financial terms of these arrangements are unregulated.

⁸ FTC Staff Report, “Broadband Connectivity Competition Policy,” <http://www.ftc.gov/reports/broadband/v070000report.pdf>, at 23-28 (June 2007) (“FTC Staff Report”) provides a more detailed overview of these components of Internet services. There is significant overlap in the firms that operate in these three categories.

- Content and application providers operate using a variety of business models. Large content providers may operate their own “server farms” with direct access to an Internet backbone. Some large content providers use distributed servers in multiple geographic areas to store or “cache” content closer to end users in order to improve service quality. Smaller content providers often contract with third parties to host content and to provide connection to the Internet. The terms of these arrangements also are unregulated.

18. The lack of systematic Internet regulation is summarized by a recent FTC report which notes that, “since about 2000, the FCC has undertaken a substantial and systematic deregulation of broadband services and facilities, concluding that cable, wireline, powerline, and wireless broadband Internet access services are ‘information services’ that are not subject to common carrier requirements.”⁹ As a result, providers of Internet services are not required to provide physical connections to other carriers; nor are they subject to obligations to provide services at “just and reasonable” rates or to comply with non-discrimination requirements.¹⁰ Similarly, the provisioning of backbone traffic and interconnection is unregulated. The FTC also notes that “[t]o this day, there are no general, industry-specific regulations that govern backbone interconnection in the U.S.”¹¹

19. As this summary indicates, the evolution of Internet business models and network management practices, many of which remain in early stages of development, largely has been driven by market forces. Internet traffic has generally been handled by service providers on a “first-in-first-

⁹ FTC Staff Report at 3.

¹⁰ *Id.* at 42.

¹¹ *Id.* at 25.

out” and “best efforts” basis.¹² While it has long been possible as a matter of technology to prioritize Internet traffic, Internet traffic has not typically been delivered or priced on this basis.

B. THE FCC INCORRECTLY ASSUMES THAT BROADBAND PROVIDERS WILL ENGAGE IN ANTICOMPETITIVE CONDUCT IN THE ABSENCE OF NET NEUTRALITY RULES.

20. As discussed above, the FCC concludes that net neutrality regulations are necessary because “market forces alone are unlikely to ensure that broadband Internet access service providers will discriminate in socially efficient ways and that, absent regulation, such discrimination is likely to change fundamentally the nature of the Internet, reduce competition, and hinder innovation and growth.”¹³

21. As a preliminary matter, it is important to note that (i) the mere existence of price differences does not imply price discrimination; and (ii) the existence of price discrimination does not necessarily imply harm to competition. For example, price differences attributable to differences in the quality of service are not “discriminatory” but instead can reflect the higher cost of providing higher quality services. Price discrimination in an economic sense exists when different groups pay different prices for identical services. Even then, the impact of discrimination on consumer welfare is ambiguous, and can result in an increase in output relative to the level that would exist without discrimination.¹⁴ More specifically, price discrimination can result in prices to certain consumers that are below those that would prevail in the absence of discrimination, leading to an increase in sales to these consumers and to an expansion of total sales. Moreover, such price discrimination raises the firm’s profits, which may create incentives for broadband access providers to invest in expanding or upgrading their networks compared to the investments that would be undertaken in the absence of discrimination.

¹² *Id.* at 2.

¹³ NPRM ¶ 67.

¹⁴ The FCC itself recognizes that discrimination can advance consumer welfare. NPRM ¶ 103.

Price discrimination is widespread in our economy and need not result in harm to competition -- i.e., harm to the competitive process that deprives or impedes consumers' access to alternative suppliers with the result that prices are higher than they would otherwise be.

22. The FCC claims that providers of broadband Internet access services may have an incentive to discriminate against rival content providers by charging relatively high fees (or providing lower quality service) to those rival content providers to reach the broadband subscribers and or even by denying access to rival content providers altogether. The economic literature discusses the applicability as well as the limitations of such a claim.¹⁵

23. Because price discrimination need not result in harm to competition or consumers, the elimination of all forms of discrimination is not an appropriate policy goal from an economic perspective and any examination of the effect of discrimination on competition is likely to require a detailed fact-specific analysis. As discussed in more detail below, available evidence indicates that regulators' interventions in similar circumstances, while well-meaning, have often resulted in harm to consumer welfare. Antitrust enforcement remains an alternative mechanism for identifying and correcting circumstances in which discrimination harms competition and thereby lowers consumer welfare.

24. More importantly, however, the NPRM fails to fully consider other incentives to provide unrestricted access to all Internet content faced by broadband access providers. These other incentives mitigate or eliminate any incentive to engage in anticompetitive discrimination and thus undercut the competitive rationale for net neutrality regulation.

¹⁵ See, for example, Richard Posner, *Antitrust Law*, 2nd ed. (2001), pp. 198-99. M. Whinston, "Tying, Foreclosure, and Exclusion," 80 *American Economic Review* 837 (1990), J. Choi and C. Stefanadis, "Tying, Investment, and Dynamic Leverage Theory," 32 *RAND Journal of Economics* 52 (2001), D. Carlton and M. Waldman, "The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries," 33 *RAND Journal of Economics* 194 (2002), B. Nalebuff, "Bundling as an Entry Barrier," *Quarterly Journal of Economics* 159 (2004).

25. First, competition among broadband access providers enables consumers to switch providers if they are not satisfied with the service from their existing provider. As discussed further below, today virtually all broadband subscribers have access to at least two, and often more, providers of broadband access services, including cable, DSL and, increasingly, wireless alternatives. In addition, available data indicate that subscribers frequently switch service providers and that broadband access providers face considerable customer “churn.”¹⁶ As a result of this competition, attempts by a broadband access provider to limit access to Internet content would be likely to result in the loss of subscribers that prefer unrestricted access, which provides a competitive constraint that limits incentives for such actions. The FTC shares this view, noting in its 2007 report that “[a]bsent coordination or collusion among providers, as long as consumers have one or more alternatives to which they can turn, it is difficult to imagine them accepting the blockage or elimination of content that is important to them.”¹⁷

26. Second, regardless of the competitive alternatives available, discrimination by broadband access providers that limits access to content usually reduces the amount that consumers are willing to pay for broadband access services. That is, consumers are willing to pay more for access to more content and, as a result, broadband access providers face disincentives for restricting access to Internet content.

C. BROADBAND ACCESS HAS BEEN CHARACTERIZED BY RAPID GROWTH IN OUTPUT, DECLINES IN PRICES AND DIRECT COMPETITION FOR NEARLY ALL CONSUMERS.

27. In today’s (largely) unregulated environment, output of broadband services has grown rapidly and prices have fallen sharply in recent years. Between mid-2002 and mid-2008, the number of high-speed broadband access lines in the U.S. grew from 16 million to nearly 133 million and the

¹⁶ “Churn” is an industry term which refers to the fraction of a service provider’s customers lost in a given time period.

¹⁷ FTC Staff Report at 157.

number of residential broadband lines grew from 14 million to nearly 80 million.¹⁸ Available data also indicate that Internet traffic roughly tripled between 2007 and 2009.¹⁹

28. At the same time, prices for broadband Internet access services have fallen sharply. According to the FTC, “[b]y one estimate, the average monthly revenue per user of DSL service decreased from 40 dollars in 2002 to 31 dollars in 2006. [...] Quality-adjusted cable modem prices too have fallen.”²⁰ For example, in 2002, Charter Communications was offering broadband service with 512 to 768 kbps speeds for \$40 per month.²¹ Today, Charter offers bandwidth of 10 mbps, roughly 13 to 20 times faster service, for the same \$40 per month.²² Similarly, the price of Verizon DSL service with 768 kbps download bandwidth fell from \$49.95 in 2001 to \$19.99 in 2007.²³ The Bureau of Labor Statistics’ Consumer Price Index for Internet services fell by roughly 25 percent over the last five years.²⁴

29. As noted above, the NPRM claims that competition in the provision of broadband access competition may not be “effective” and thus may not constrain broadband access providers from engaging in anticompetitive discrimination. However, available data also indicate that most areas are

¹⁸ FCC, *High Speed Services for Internet Access*, <http://www.fcc.gov/wcb/iatd/comp.html> (follow July 2009 Release to Tables 1, 3) (“FCC High Speed Services Report”).

¹⁹ University of Minnesota Internet Traffic Studies, <http://www.dtc.umn.edu/mints/home.php>, p. 5 of 7, accessed on December 22, 2009; and Goldman Sachs, “Broadband 100: Fears ‘Over the top’? Early stage broadband video investing across Tech, Media and Telecom,” p. 7, May 2009 (“Broadband 100”).

²⁰ FTC Staff Report at 101 (internal citations omitted).

²¹ Jason Bazinet, Mark Crossman, Spencer Wang, J. P. Morgan, “Broadband 2003: Deflation Looms and Market Shares Will Shift,” p. 8 (December 5, 2002).

²² <http://www.charter.com/Visitors/Products.aspx?MenuItem=36>.

²³ R. Litan and H. Singer, “Unintended Consequence of Net Neutrality Regulation,” 5. J. on Telecom. & High Tech. L. 533 (2007), available at SSRN: <http://ssrn.com/abstract=942043>.

²⁴ BLS, Consumer Price Index – All Urban Consumers, Series SEEE03: Internet services and electronic information providers, <http://data.bls.gov:8080/PDQ/servlet/SurveyOutputServlet;jsessionid=6230780901981e1c6623> (last visited Jan. 11, 2010).

served by multiple providers of broadband Internet access services. FCC data indicate that in June 2008, the most recent data available, 99.8 percent of zip codes in the U.S. had two or more providers of high speed Internet lines available and 94.6 percent of zip codes had four or more providers.²⁵

30. Available data also indicate that switching or “churn” among broadband customers is substantial.

- Available data indicate that churn among broadband customers is comparable to that observed among consumers of other telecommunications services. For example, Cablevision’s monthly churn rate in 4Q 2007 was 2.1 percent for its cable customers and 2.2 percent for its high speed data customers.²⁶ Similarly, monthly churn in 2008 among Verizon’s FiOS customers (who receive both video and Internet access services), was 2.0 percent,²⁷ while churn among Verizon’s wireless subscribers was 1.3 percent.²⁸
- The research firm IDC conducts an annual survey of broadband subscribers in the U.S. and its most recent report notes that “broadband churn is on the rise.”²⁹ The IDC data indicate that more than 50 percent of subscribers had switched at some point since adopting broadband.³⁰

²⁵ *FCC High Speed Services Report*, Table 15. The FCC tracks high speed lines available through ADSL, SDSL, cable modem, fiber, satellite, fixed wireless, mobile wireless and power line technologies.

²⁶ Buckingham Research, *The Last Mile – Monitoring Quarterly Trends in Telecommunications, Video and Data*, August 27, 2008, p. 91.

²⁷ Credit Suisse, *Verizon – Positioning for the Future*, October 22, 2009, p. 17.

²⁸ RBC Capital Markets, *Wireless Retail Update – Telecommunications Services*, Nov. 22, 2009, p. 2.

²⁹ IDC, “Profile Of U.S. Broadband Consumers – 2009 Survey,” (December 2009), p. 20.

³⁰ IDS “churn” measures exclusively reflects customers that switch broadband suppliers; Verizon churn figures reflect customer terminations for all reasons including, for example, cancellations and moves.

D. INCREASES IN BROADBAND COMPETITION FURTHER REDUCE THE LIKELIHOOD OF THE COMPETITIVE CONCERNS RAISED BY THE FCC.

31. Competitive concerns of the type cited by the FCC are further mitigated by the entry of new broadband service providers. In addition, existing providers are expanding and upgrading their networks in response to, and in anticipation of, the large on-going increases in Internet demand, which are discussed in more detail below. The new technologies being offered by both entrants and existing market participants, including 4G wireless services (using WiMax or LTE technologies), high-capacity fiber-based services, and upgraded cable-based services (using DOCSIS 3.0 technology), offer significant increases in throughput to subscribers.

32. In a recent report for the FCC, the Columbia (University) Institute for Tele-Information identified a wide variety of high capacity broadband access services now in the process of being deployed.³¹ Among others:

- Clearwire announced that its 4G wireless broadband services using WIMAX technology will be launched in 25 markets by the end of 2009.
- MetroPCS announced that its 4G wireless service will be deployed in the second half of 2010.
- Sprint announced plans to launch its dual mode 3G/4G service in at least 10 markets in 2009 and that it will continue to add markets in 2010.
- AT&T announced that it will begin trials of its 4G LTE wireless broadband technology in 2010 and will launch service in 2011. AT&T also announced that its U-Verse Fiber/DSL service will pass 30 million homes by 2011.
- Cincinnati Bell launched its fiber-to-the-home (FTTH) service in 2009.
- Verizon announced that it will offer 4G LTE wireless broadband technology to 100 million people by 2010 and to virtually its entire service area by 2013.³² Verizon has

³¹Robert Atkinson and Ivy Schultz, Columbia Institute for Tele-Information, "Broadband in America: Where It is and Where It is Going, Preliminary Report Prepared for the Staff of the FCC's Omnibus Broadband Initiative," at 51-52 (November 11, 2009) ("CITI Report").

³² CITI Report at A-35.

announced plans for its FiOS service to cover 70 percent of the footprint of its local telecommunications network.

- ViaSat and Hughes Communications have each announced plans to deploy “high throughput” satellite-based broadband access services. Each firm is expected to have the capacity to provide broadband services to roughly 2 million homes.³³

33. The CITI Report also shows that 4G deployments will compete directly with wireline and other existing broadband providers. For example, it shows that 4G wireless broadband offerings will have downstream speeds of 4-12 Mbps range, which is comparable to or higher than that offered by many wireline broadband services providers.³⁴ It also shows that prices for early 4G deployments are comparable to those for wireline broadband services.³⁵

34. The CITI Report further shows that entry and deployment of upgraded services is not limited to major metropolitan areas. CITI tracks the activity of Wireless Internet Service Providers (WISPs) which provide wireless broadband services in rural areas using Wi-Max technology and reports that “the 350 members of the WISP Association – far from the total number of WISPs – provide fixed broadband wireless services to over 2 million locations.”³⁶ CITI also reports that OpenRange, a WISP funded by private and public sources, has “plans to use Wi-MAX to initially serve 6 million people in 546 communities in 17 states and recently began offering its first services ...”³⁷ The credibility of these announcements is reinforced by CITI’s analysis that compares the initially projected and actual deployment dates for broadband projects publicly announced in 2004-05. Their analysis indicates that

³³ *Id.* at 57.

³⁴ *Id.* at 24.

³⁵ *Id.* at 34-35.

³⁶ *Id.* at 24.

³⁷ *Id.* at 24 (internal citations omitted).

all of the projects announced in that period were completed and that the large majority launched within a few months of the date initially projected.³⁸

35. As these examples indicate, broadband access providers typically face significant competition and a wide range of firms are entering and/or upgrading their service offerings. Under these circumstances, broadband service providers that adopt business models that don't meet consumers' preferences and expectations risk losing substantial numbers of subscribers. These circumstances reduce the risk that attempts by broadband access providers to engage in discrimination will succeed in impairing competition and further suggest that the FCC's competitive concerns are overstated.

36. More generally, the rapid growth and dynamic nature of broadband Internet services provides existing market participants and entrants with strong incentives to compete and attract new customers, even when there are a limited number of suppliers.³⁹ Under these conditions, firms compete to attract new customers and retain existing ones by attempting to be the first to offer higher service quality as well as through price competition. Given the large investments being undertaken by broadband Internet access providers to support the expansion in output, regulatory policies that discourage investments supporting network upgrades can result in significant harm to consumer welfare.

³⁸ *Id.* at 41.

³⁹ Even limited competition when networks were first deploying service has been found to have significant effects. For example, the early adoption of broadband was significantly higher in areas served by both cable modem and DSL providers compared to those served by only one technology. As discussed by Crandall, "Broadband Communications," in Majumdar, Vogelsang, and Cave, eds, Handbook of Telecommunications Economics, v. 2 (2005), p. 177, Burnstein and Aron show that in 2002, 14.5 percent of households in areas served by both cable and DSL providers received broadband compared to 8 percent of households in areas served by only one technology. (D. Burnstein and D. Aron, "Broadband Adoption in the United States: An Empirical Analysis," in A. Shampine, ed., Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications Technology (2003)).

E. THERE IS NO EVIDENCE TO DATE OF WIDESPREAD COMPETITIVE PROBLEMS.

37. To support its argument that net neutrality rules are required to avoid anticompetitive discrimination, the NPRM highlights two circumstances in which broadband access providers have attempted to degrade services provided by rival content providers. The FCC highlights Comcast's alleged attempts to degrade Internet traffic from the "BitTorrent" application, a technology which uses multiple sources in delivering services via the Internet to a single computer.⁴⁰ BitTorrent is typically used to distribute large video files which may compete with programming provided through Comcast's cable-TV service. The FCC also highlights efforts by Madison River, a small local exchange carrier, to block its DSL subscribers from accessing VoIP providers such as Vonage which compete with telephone service provided by Madison River.⁴¹ The FCC stresses that both Comcast and Madison River did not disclose to subscribers that they had engaged in these network management practices.⁴²

38. Comcast contends that its actions were undertaken to relieve network congestion caused by the high traffic volume generated by BitTorrent users. In response to the complaint about these practices, Comcast developed an alternative network management plan that, instead of selectively blocking BitTorrent traffic, caps usage by subscribers that are intensive consumers of bandwidth.⁴³ More specifically, during periods of congestion the highest volume users have their traffic assigned a lower priority until the period of congestion ends.⁴⁴ While the facts of the Madison River

⁴⁰ NPRM ¶ 37.

⁴¹ *Id.* ¶ 32.

⁴² *Id.* ¶¶ 37, 123.

⁴³ We understand that the FCC accepted Comcast's revised network management plan but did not drop the case in response as requested by Comcast. We also understand that Comcast is now challenging the FCC's order. NPRM ¶ 37.

⁴⁴ Letter from Comcast to Marlene H. Dortch, FCC, *Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications*, File No. EB-08-IH-1518; *Broadband Industry Practices; Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management,"* WC

case are less clear, Madison River entered into a consent decree with the FCC, made a “voluntary” payment of \$15,000 and agreed to cease its practice of attempting to block subscribers’ access to VoIP services.⁴⁵

39. The Comcast and Madison River cases appear to be isolated incidents and, by themselves, do not suggest that broadband access providers to date have engaged in widespread efforts to degrade Internet traffic by rival content providers. This may be due in part to the risk of losing subscribers to rival access providers that will provide unrestricted access to Internet content. We understand that both Comcast and Madison River modified their network management practices shortly after detection even though the FCC’s authority to require any such modification remains uncertain. These circumstances suggest that both Comcast and Madison River were concerned that, once public, information about their actions could lead to customer complaints and/or result in the loss of subscribers.

40. Actions that facilitate the transparency of broadband access providers’ network management practices may facilitate the timely detection of attempts at anticompetitive discrimination. We understand that Verizon has publicly supported the creation of industry best practices or principles aimed at increasing transparency and providing consumers with meaningful information concerning network management practices or other aspects of available Internet and broadband services and applications.

41. The ability of content providers and others to detect (and publicize) efforts by access providers to block or degrade content also helps deter these activities. The ability of content providers

Docket No. 07-52, Attachment B, “Comcast Corporation Description of Planned Network Management Practices to be Deployed Following the Termination of Current Practices,” at 2 (Sept. 19, 2008) (“Comcast Network Management Plan”).

⁴⁵ J. Gregory Sidak, “A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet,” 2 *Journal of Competition Law and Economics* 349, 415 (2006).

and others to detect anticompetitive discrimination is facilitated by their ability to establish benchmarks based on network performance in different geographic areas. A variety of organizations are active in monitoring Internet performance and offer tools to achieve this goal. For example:

- Akamai's Site Analyzer allows detailed analysis of each Internet transaction step and the localization of any problems by type, location and network.⁴⁶ Users can even "set up alerts on performance degradation and availability.... Alerting allows owners to proactively act upon these degradations before actual end users report the same."⁴⁷
- Measurement Lab, also known as M-Lab, "is an open, distributed server platform for researchers to deploy Internet measurement tools. The goal of M-Lab is to advance network research and empower the public with useful information about their broadband connections."⁴⁸ M-Lab was founded by the Open Technology Institute, the PlanetLab Consortium, Google Inc. and academic researchers. M-Lab supports a variety of network diagnostic tools on servers in a variety of locations.⁴⁹
- Internet performance monitoring is also regularly undertaken by academic researchers. For example, the Georgia Tech Network Operations and Internet Security Lab recently released NANO (Network Access Neutrality Observatory), an Internet performance monitoring tool which "detects whether a user's access ISP is discriminating against certain users, destinations or applications."⁵⁰ Similarly the Max Planck Institute for

⁴⁶ See Akamai Site Analyzer Service Description.

http://www.akamai.com/dl/feature_sheets/Akamai_Site_Analyzer_Service_Description.pdf (July 2009).

⁴⁷ *Id.* at 12.

⁴⁸ <http://www.measurementlab.net/about> (last visited Dec. 22, 2009).

⁴⁹ See *id.*

⁵⁰ <http://gtnoise.net/>.

Software Systems conducts research on measurement of network performance and identifying technical discrimination.⁵¹

F. ALTERNATIVE MECHANISMS EXIST FOR DETERRING THE POTENTIAL ANTICOMPETITIVE CONDUCT THAT IS THE FOCUS OF THE FCC'S CONCERNS.

42. The FCC's NPRM recognizes that discrimination can either benefit or harm consumer welfare and acknowledges that "[t]he key issue we face is distinguishing socially beneficial discrimination from socially harmful discrimination in a workable manner."⁵² Attempting to determine when "discriminatory" business practices harm competition and thereby lower consumer welfare typically requires detailed fact-specific analysis that takes into account factors such as (i) the impact of discrimination on competition in both upstream (content) and downstream (broadband access) markets; (ii) the efficiency rationale for such practices; and (iii) the potentially adverse impact of a remedy (such as imposing a duty to deal with a rival) on incentives for investment and innovation.

43. Analysis of the impact of discrimination on competition is a common focus of antitrust analysis by economists and courts, and antitrust enforcement provides a mechanism for addressing competitive concerns of the type raised by the FCC. Alternatively, forms of regulation short of net neutrality may be used to address specific anticompetitive circumstances if and when such circumstances may arise. Limited legal and regulatory responses tailored to specific harms actually observed in the marketplace, as opposed to imposition of expansive and preemptive regulatory rules based on competitive circumstances not widely observed in the marketplace, would be likely to protect competition while reducing the risk of potentially large harm to consumer welfare.

⁵¹ See, for example, M. Dischinger, A. Mislove, A. Haeberlen, and K. Gummadi, "Detecting BitTorrent Blocking," Max Planck Institute for Software Systems, http://www.mpi-sws.org/~gummadi/papers/08_imc_blocking.pdf (2008).

⁵² NPRM ¶ 103.

44. As discussed below, preemptive imposition of net neutrality regulation limits or eliminates network service providers' ability to experiment with new business models and network management practices and can result in significant harm to consumer welfare. At the same time, the lack of widespread competitive problems to date, the availability of multiple broadband access providers and the growth in competitive alternatives indicates that such a far-reaching regulatory intervention is not necessary to protect competition.

45. Implementation of net neutrality regulations will also create uncertainty among market participants as the FCC develops complex rules and exemptions from these rules in its attempt to implement the proposed regulation. For example, the proposed language for each of the six Internet Principles proposed by the FCC stresses that implementation would be "subject to reasonable network management" considerations, and the FCC recognizes that "[t]here appear to be several types of situations that could justify a broadband Internet access service provider's acting inconsistently with the six open Internet principles described above."⁵³ The uncertainty about practices that may be prohibited under net neutrality rules would be likely to chill adoption of efficient network management practices.

G. THERE IS NO BASIS TO ASSUME THAT REGULATORS CAN SPECIFY BUSINESS PRACTICES THAT MAXIMIZE CONSUMER WELFARE, ESPECIALLY IN A RAPIDLY CHANGING ECONOMIC ENVIRONMENT.

46. The FCC's NPRM outlines its objective of maintaining many aspects of the current economic organization of the Internet into the indefinite future. However, the business models and network management practices widely used today may not best promote consumer welfare in the future. It is not realistic to believe that even well-meaning regulators can determine which business models and network management practices are likely to work best in the future. Current practices have

⁵³NPRM ¶ 136.

been driven by market factors, not regulation, and it should not be assumed without evidence that markets will fail to create incentives for efficient business practices to promote consumer welfare.

47. The unregulated Internet marketplace has resulted in rapid output growth, improved service quality and declining prices. An unregulated market also would likely result in experimentation with different business models and network management practices by broadband access providers as they respond to the large expected increases in bandwidth demand. If consumers prefer the business models and network management practices currently in use, service providers will have strong incentives to maintain them. And as long as traditional Internet access services are an available alternative, consumers would also benefit from access to additional, differentiated services that may or may not incorporate all Internet content.

48. However, studies show that attempts to regulate new or rapidly changing technologies carry significant risk of harm to consumer welfare. A 2002 paper by R. Crandall, R. Hahn and T. Tardiff reviewed the impact of regulation on new technologies through six case studies involving telephone service, television programming, cable television, wireless services, information services and converged telephone/video services. The authors conclude that:

These six cases illustrate four important points. First, regulation has often served to suppress innovation. Second, the delay in the introduction of new services can be quite costly to consumers. Third, deregulation can result in significant benefits when markets are workably competitive or even when there is arguably market power, as there was in the cable industry. Fourth, vertical integration by even large, dominant firms is often essential to the efficient development of new goods and services.⁵⁴

49. One of the studies reviewed by Crandall, Hahn and Tardiff is the 1997 analysis by J. Hausman that estimates the loss to consumers resulting from regulation-induced delays in the

⁵⁴ Robert Crandall, Robert Hahn and Timothy Tardiff, "The Benefits of Broadband and the Effect of Regulation," in Robert Crandall and James Alleman, eds., Broadband: Should We Regulate High-Speed Internet Access?, AEI-Brookings Joint Center for Regulatory Studies, Washington, D.C., (2002), p. 324.

introduction of new telecommunications technologies. Hausman analyzed costs relating to (i) delays in the introduction of voice messaging services, which resulted from the line-of-business restrictions imposed on the former Bell companies following the AT&T divestitures; and (ii) delays in the introduction of cellular telephone service due to “regulatory indecision and the subsequent licensing procedure used by the FCC, which was in charge of the cellular spectrum.”⁵⁵

50. Hausman concludes that delays in new telecommunications services caused by regulation imposed multi-billion dollar losses to consumers:

If, as I estimate, the consumer value from [voice messaging] services was \$1.27 billion in 1994, then the approximate ten-year regulatory delay cost consumers billions of dollars. Applying the methodology to the cost of regulatory delay in the introduction of cellular telephone service, I estimate the cost to consumers to be closer to \$100 billion in total, with more than \$25 billion lost in a single year.⁵⁶

IV. NETWORK NEUTRALITY RULES ARE LIKELY TO HARM CONSUMER WELFARE BY DETERRING INVESTMENT AND PREVENTING NETWORK SERVICE PROVIDERS FROM ADOPTING EFFICIENT PRACTICES.

A. CHANGES IN INTERNET-BASED SERVICES AND TECHNOLOGY

51. The on-going market-based evolution of Internet services has contributed to the tremendous growth in the use of the Internet. As noted above, the number of high-speed broadband access lines in the U.S. grew from 16 million to nearly 133 million between 2002 and 2008 and Internet traffic roughly tripled over the period 2007-2009.⁵⁷

⁵⁵ Jerry Hausman, “Valuing the Effect of Regulation on New Services in Telecommunications,” Brookings Papers on Economic Activity (1997), p, 17.

⁵⁶ *Ibid.*, p. 3.

⁵⁷ University of Minnesota Internet Traffic Studies, <http://www.dtc.umn.edu/mints/home.php>, p. 5 of 7 (last visited Dec. 22, 2009); and Goldman Sachs, “Broadband 100: Fears ‘Over the top’? Early stage broadband video investing across Tech, Media and Telecom,” p. 7 (May 2009) (“Goldman Sachs”), and FCC High Speed Services Report, Tables 1,3.

52. The growth of broadband access and other increases in the capacity of backbone networks have contributed to rapid growth in the availability and use of bandwidth-intensive services, and this growth is expected to continue and even accelerate. In a May 2009 report, Goldman Sachs noted that “[b]roadband access has reached mass market levels and is progressing toward near universal adoption. Online video is emerging as a dominant application of the incremental bandwidth.”⁵⁸ The same report notes that on-line video traffic grew 100 percent in 2008 and was expected to grow more than 75 percent in 2009.⁵⁹

53. The ability to view Internet-based video services on television sets is expected to greatly increase demand for these services, but few households today have the capability of accessing “Internet-to-TV” services. Goldman Sachs estimates that less than five percent of homes had adopted Internet-to-TV technology in 2009, but projects that this figure will rise to 20 percent within two to four years, and that adoption will then continue to grow rapidly.⁶⁰

54. The growth of high-bandwidth video services is expected to result in enormous increases in the demand for Internet bandwidth. The CITI Report projected that (non-mobile) North American consumer Internet traffic would increase from just over 1 petabit/month in 2008 to more than 7 petabits per month by 2013.⁶¹ The same report projects that the Internet bandwidth use per U.S. subscriber will grow by 360 percent between 2008 and 2013.⁶² Goldman Sachs notes that “a minute spent with streaming video consumes almost 20 times the bandwidth of a minute with a typical web

⁵⁸ Goldman Sachs at 3.

⁵⁹ *Id.* at 9.

⁶⁰ *Id.* at 16.

⁶¹ CITI Report at 49. A petabit is a unit of information equal to 1,000 terabits or one quadrillion bits.

⁶² *Id.* at 50.

page without video”⁶³ and also projects that video services will account for more than 75 percent of Internet traffic by 2012.⁶⁴

55. The growth in Internet services and the demand for bandwidth create risk of increased network congestion in the delivery of Internet services. Capacity constraints may have relatively little adverse impact on the quality of services such as e-mail and web-surfing but can have a significant adverse effect on the quality of high-bandwidth, time-sensitive services such as streaming video. Various cable networks have recently considered usage-based pricing for broadband as one alternative solution to this problem.⁶⁵ Others, including Comcast, have imposed caps on individual subscribers with high levels of broadband use.⁶⁶

56. The rapid growth of bandwidth intensive services has already changed how high-bandwidth content is delivered to subscribers. As noted above, major providers of bandwidth-intensive content often use content delivery networks (CDNs) in delivering traffic to end users. CDNs, such as Akamai, distribute copies of video files to servers at geographic locations near subscribers. These services help maintain the quality of Internet-based video services by avoiding congestion and reducing latency problems.

57. However, the manner in which delivery mechanisms will evolve and be priced has been the subject of widespread discussion among analysts and industry observers.⁶⁷

⁶³ Goldman Sachs at 7.

⁶⁴ *Id.* at 8.

⁶⁵ *Id.* at 17.

⁶⁶ See Comcast Network Management Plan.

⁶⁷ Various alternatives are discussed in J. Peha, “The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy,” 1 International Journal of Communications 644 (2007).

- As discussed above, prioritizing traffic and charging higher rates for priority traffic is one possible response to changes in Internet demand and technology.
- Networks also could include the ability to charge on the basis of content, with price differences for different types of traffic affecting overall demand and usage patterns.
- Networks could include the ability to offer customers differentiated access to the most efficient traffic routing and/or limits on the rate at which packets can be sent into the network.
- Differential pricing may be offered based on access to various services provided within the network, such as “multicasting” technology which enables a sender to reach multiple recipients without sending a separate copy to each one over the entire transmission path.

58. In addition, a variety of differentiated services may result in benefits to consumers but may be inconsistent with net neutrality rules. For example, medical and/or gaming services may require specialized performance criteria that cannot be efficiently provided to all content providers. More generally, the adoption of restrictions on network operations and business models can inhibit the development of services that otherwise might be developed in the future.

59. As these examples suggest, there are a variety of complex alternatives available to network providers wishing to establish economically efficient network management practices and services. It is unlikely that regulators can determine which combinations of these are most likely to promote consumer welfare. As noted above, errors by regulators in attempting to make such determinations can result in significant harm to consumer welfare. The large and growing importance of the Internet implies that the potential impact of regulatory errors also can be large.

B. NET NEUTRALITY RULES WOULD LIMIT THE ABILITY OF NETWORK SERVICE PROVIDERS TO RESPOND TO CHANGES IN DEMAND AND TECHNOLOGY.

60. To date, Internet service providers have maintained a “first-in-first-out approach” to network management. The imposition of net neutrality regulations, however, would require the providers of network services to maintain this approach without regard for changes in technology and consumer demand, eliminating their ability to experiment with other business models and network management practices in attempting to respond to the rapid growth of bandwidth demand.

61. The choice of network management practices depends on a variety of factors including, among other things: (i) the cost of transport capacity; (ii) the cost to consumers and content providers resulting from network congestion; (iii) the cost of distributing and storing content at multiple geographic locations; and (iv) the cost of using compression technologies in transmitting data traffic. While some alternatives like content delivery networks may now provide an efficient response for some types of content, existing models may not be efficient at the much higher levels of bandwidth demand expected in the near future.

62. In addition, net neutrality rules can interfere with pricing mechanisms that could provide signals for network providers to add capacity, or that could lead content providers to adopt efficient data compression practices. For example, in the absence of net neutrality regulation, the adoption of priority service depends both on consumers’ and content providers’ willingness to pay for higher service quality (through prioritized services) and the costs to network operators of providing such services.

63. The importance of network management practices for Internet services can be appreciated by examining the current approaches used in managing private data networks. The widespread use of “enhanced traffic management” practices in private data networks suggests that consumer welfare might be enhanced if network service providers can offer priority services. For

example, Verizon's Private IP Service, which is used by firms and organizations to link distant locations and is in widespread use today, enables users to assign different priority levels to various types of traffic.⁶⁸ Typically, Private IP Service networks assign top priority status to time-sensitive applications such as video and voice for which latency can result in a significant decline in service quality; intermediate priority classes are assigned to applications such as "business critical" traffic flows (e.g., SAP, PeopleSoft applications) and less time-sensitive video; and lower forwarding priorities are assigned to e-mail, file transfer and web browsing.

64. Verizon's Private IP Service customers can choose not to set priority levels for different types of services and Verizon could have chosen not to offer this option. Presumably, a decision not to prioritize would require users to obtain greater transmission capacity in order to maintain a given level of congestion and service quality. The decisions by Verizon and its Private IP Service network customers to prioritize private network traffic demonstrate that this feature enhances consumer welfare.

65. There are a variety of other changes in business models that may promote consumer welfare. For example, network service providers may find it efficient to charge different fees to providers of different types of services or may choose to establish relationships with content providers for differentiated offerings. As discussed above, the NPRM has identified potential competitive concerns arising from such practices. However, differentiated business models and network management practices may benefit consumers by expanding output of Internet services. For example, business models that involve payments from certain content providers to broadband access providers may enable access providers to lower prices to consumers. This approach may result in an expansion in the number of broadband subscribers and may facilitate entry by new providers of broadband access services. Similarly, broadband access providers may choose to offer different service options to

⁶⁸ See http://mediumbusiness.verizon.com/documents/resource_library/PrivateIP_FactSheet.pdf.

consumers, including services comparable to those offered today with non-prioritized access to content available on the public Internet, and enhanced services with features such as prioritized access and exclusive content.

C. IMPOSITION OF NET NEUTRALITY REQUIREMENTS IS LIKELY TO DETER INVESTMENT AND HARM CONSUMER WELFARE.

66. Imposition of net neutrality rules that limit experimentation with new business models and network management practices will prevent network operators from enhancing the functionality of their networks and will undermine the business case for investing in higher capacity broadband networks. For example, limiting pricing flexibility will reduce network operators' incentives to invest in expanding and upgrading their facilities. Such restrictions may adversely affect consumer welfare by potentially (i) reducing the geographic scope of broadband access networks; (ii) reducing backbone capacity; (iii) increasing congestion and reducing service quality; (iv) reducing the number of service providers in a given geographic area; and (v) raising prices.

67. In a recent filing, the U.S. Department of Justice (DOJ) acknowledged that price regulation is likely to deter investment and innovation. The DOJ warned that, "... care must be taken to avoid stifling the infrastructure investments needed to expand broadband access. In particular, price regulation would be appropriate only where necessary to protect consumers from the exercise of monopoly power and where such regulation would not stifle incentives to invest in infrastructure deployment." Net neutrality can be considered a form of price regulation because it limits the form of pricing that can be practiced. Such regulations thus limit a broadband provider's revenue opportunities and its ability to differentiate itself from competitors, and thereby stifle incentives to invest and innovate.⁶⁹

⁶⁹ See Ex Parte Submission of the United States Department of Justice, *Economic Issues in Broadband Competition; A National Broadband Plan for Our Future*, GN Docket No. 09-51, at 28 (Jan. 4, 2010).

68. The importance of maintaining the appropriate investment incentives for broadband network providers is highlighted by the large scale of capital expenditures that telecommunications carriers are expected to undertake in coming years. CITI estimates that telecommunications providers, including wireline carriers, wireless carriers and cable operators, made capital expenditures of \$63 billion in 2008, excluding payments related to spectrum auctions.⁷⁰ CITI also estimates that the top 10 telecommunications companies had expenditures of roughly \$58.9 billion, and that in 2009, despite the recession and financial crisis, these large companies had capital expenditures of \$51.5 billion.⁷¹

69. CITI also reports that AT&T estimates that two-thirds of its 2009 total investment (for wireless and wireline networks) is to expand its broadband capacity.⁷² Finally, CITI reports that the capital expenditures of the major wireline carriers will grow from \$22 billion in 2009 to \$24 billion in 2011, and that the share of these investments going to expand broadband will increase from 52 percent to 58 percent.⁷³

D. THE FCC INCORRECTLY ASSUMES THAT “NON-NEUTRALITY” WILL HARM INNOVATION.

70. The FCC and net neutrality proponents correctly note that the Internet has fostered tremendous innovation. However, there is no basis to conclude that “non-neutral” business models and network management practices would be expected to harm innovation. Net neutrality restrictions that limit the ability of network operators to realize the full value of their investments also limit their incentives to innovate.

⁷⁰ CITI Report at 29.

⁷¹ *Id.* at 29.

⁷² *Id.* at 30.

⁷³ *Id.*

71. The dramatic growth of applications for Apple's iPhone demonstrates that rapid innovation is possible in a differentiated or managed environment. For example, Apple's iPhone operates only on AT&T's network but has fostered the development of a wide variety of iPhone-specific applications. Application providers need approval to be carried in the iPhone "App Store," pricing must be approved by Apple, and revenue must be shared with Apple. Similarly, Verizon's FiOS service provides "widgets" that enable subscribers to access particular websites and Internet services such as Facebook through television screens. These applications are innovations that are likely to be of value to consumers but which we understand might not be available under net neutrality rules because they cannot be used to access all Internet content.

72. Net neutrality rules also can deter investment in the development of new content and applications. First, as discussed above, many factors -- including the availability of competitive providers of broadband access services -- limit the incentive and ability of broadband access providers to degrade or deny access to new content providers. In addition, network management practices that differentiate between types of traffic may improve the utilization and quality of high-bandwidth services and encourage investment in innovations that take advantage of improved network performance. For example, networks had to improve before streaming HD video applications could be developed, and they will have to improve again before streaming 3-D HD video applications can be developed. The ability of broadband access providers to enter differentiated arrangements with content or application partners may promote investment in the development of innovations and new services that would not otherwise be undertaken.

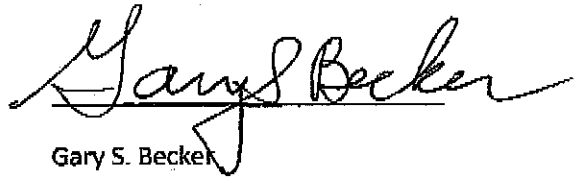
CONCLUSION

73. The FCC's net neutrality rules are motivated by the concern that broadband access providers will harm competition by disadvantaging rival content providers. We conclude that this

concern does not justify the imposition of net neutrality rules due, in part, to the existence of substantial competition today in the provision of broadband access service and the increasingly competitive nature of broadband access services now occurring as the result of the entry, expansion and upgrading of broadband networks. Under these circumstances, broadband access providers have strong incentives to retain subscribers by providing services that promote consumer welfare. Given the lack of widespread competitive problems of the type specified by the FCC to date, it is likely that remedies to future competitive problems, if they occur, can be addressed by antitrust enforcement and/or more limited regulatory mechanisms.

74. The Internet is dynamic and is undergoing dramatic increases in demand and changes in the nature of services provided. It is highly unlikely that a regulator can correctly identify the business model and network management practices that maximize consumer welfare. Indeed, historical examples indicate that past interventions by regulators can delay the introduction of new technologies and result in significant harm to consumers. The proposed net neutrality rules would freeze in place the business models and network management practices that currently characterize the provision of Internet services and artificially restrict the ability of Internet service providers to respond to changes in technology and demand. As a result, consumer welfare is likely to be harmed and service providers will face weakened incentives to invest and innovate.

I declare, under penalty of perjury, that the foregoing is true and correct.


Gary S. Becker

January 14, 2010

I declare, under penalty of perjury, that the foregoing is true and correct.

Dennis W. Carlton

Dennis W. Carlton

January 14, 2010